Manuscript Report No. 91-09

Manitoba's Threatened and Endangered Grassland Birds Project. 1990 Update.

By De Smet, K.D. 1991

Manitoba
Natural Resources
Wildlife Branch

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Endangered Species and Nongame Section
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ABSTRACT

Field work and conservation efforts for threatened and endangered grassland birds in southern Manitoba continued during 1990. Surveys revealed further declines in Burrowing Owls (Athene cunicularia), Loggerhead Shrikes (Lanius ludovicianus) and Baird's Sparrows (Ammodramus bairdii), and an increase in Ferruginous Hawk (Buteo regalis) nesting pairs. Burrowing Owl productivity was high; 93 young were banded. Ferruginous Hawks experienced poor nesting success, nevertheless 78 young were banded. Loggerhead Shrike nesting success was adequate; 542 young were banded. Thirteen Baird's Sparrow nests were located and 22 young were banded. Return rates for adult and juvenile Burrowing Owls suggest high post-breeding mortality. Three percent of the adult Loggerhead Shrikes were previously banded as juveniles in Manitoba. One adult Ferruginous Hawk had been banded as a juvenile in 1988. Four adult and 48 juvenile Burrowing Owls from Saskatchewan were released in southwestern Manitoba. Nine nesting structures were used by Ferruginous Hawks during 1990; 30 additional structures were erected. Other activities included public education and landowner awareness programs, leasing of critical grassland parcels, and preparation of National Recovery Plans for each species.

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Sight records were contributed by Margaret Anderson (Wpg.), Dave Barnes (Brandon), Jenevive Barre (Pipestone), Romeo Barre (Pipeston), Brian Barsness (Pierson), Ken Belcher (Wpg), Don Bell (Lyleton), David Braddell (Reston), Rick Branston (RM of Albert, Tilston), Ron Brisly (RM of Brenda, Waskada), Jeff Canon (Waskada), Earl Charles (Hartney), Dan Chranowski (Brandon), John Christie (Wpg.), Bob Clark (Virden), Brad Coe (RM of Cameron, Hartney), Cal Cuthbert (Minnedosa), Frank DuBarr (Virden), Peter Dyck (Whitewater), Dennis Fast (Kleefeld), Cliff Findley (Shoal Lake), Rodney and Cindy Gardham (Crandall), Ken Gardner (Stonewall), Keith Goforth (Pierson), Louise, Gary and Dennis Gould (Melita), Mike Green (U. of North Carolina), Jerry and Cindy Greenley (Lyleton), Gord Grieef (Wpg.), Glen Grierson (Broomhill), Sandra Hainsworth (Deloraine), David Hatch (Oak Lake), Frank Hays (Deleau), S.C. Hobbs (Deloraine), George Holland (Wpg), Jean Horton (Brandon), Dave Johnson (Souris), Wayne Johnson (Winnipeg), Bob Jones (Portage), Kris Kaasgard (Pipestone), Rudolph Koes (Wpg.), Rob Lamont (Brandon), Dale McBurney (Hartney), Jim McNabe (Wpg), Ian Milliken (Reston), Tom Moran (Boissevain), John Morgan (Argyle), Patrick Mosset (Medora), John Murray (Lyleton), Robert Parsons (Wpg.), Mike Paryniuk (MacGregor), Larry Renwick (Melita), Orv Richards (Wpg.), Paul Rousson (Oak Lake), Fred and Betty Shiloff (Douglas), Al and Dorothy Shritt (Altona), Norm and Donna Short (Rivers), Martin Siepman (Wpg.), Phyllis Stone (Brandon), Peter Taylor (Pinawa), Russ Tkachuk (Wpg.), George Turner (Lauder), Gordon Voth (Medora), Georgina Wallace (Medora), Bill Walley (Dauphin), Ralph and Mary Wang (Pierson), and Ken Wray (Tilston).

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INTRODUCTION

Many rare, threatened or endangered grassland species have their provincial distribution virtually restricted to grasslands of the extreme southwestern Manitoba. Four threatened and endangered bird species in this area have been the focus of conservation efforts since the early 1980's; these are the Burrowing Owl (Athene cunicularia), Ferruginous Hawk (Buteo regalis), Loggerhead Shrike (Lanius ludovicianus) and Baird's Sparrow (Ammodramus bairdii). During the 1980's, Burrowing Owl populations dropped from over 100 pairs to about 30 known nesting pairs (Wedgwood 1978, Ratcliff 1986, Thomson 1988, Haug and Churchward 1989, De Smet and Conrad 1990). Despite recent increases in Ferruginous Hawk populations, there are less than 100 pairs in the province and numbers are believed to be at or near a peak high (De Smet and Conrad 1989a, 1990). The threatened Loggerhead Shrike occurs in low numbers throughout southern Manitoba; more than 90% of the remaining population occurs in the extreme southwest (De Smet and Conrad 1987, 1989b, 1990). Baird's Sparrow populations in Manitoba have disappeared in most areas except in the extreme southwest (Ratcliff 1987, De Smet and Conrad 1989c, 1990).

These four species all share a common problem, namely habitat (grassland) losses. Other species which are monitored on an incidental basis in the southwest and for which concerns also focus around disappearance of their grassland habitat include Marbled Godwits (Limosa fedoa), Willets (Catoptrophorus semipalmatus), Upland Sandpipers (Bartramia longicauda), Say's Phoebes (Sayornis saya), Willow Flycatchers (Empidonax traillii), Sprague's Pipits (Anthus spragueii), Lark Buntings (Calamospiza melanocorys), Grasshopper Sparrows (Ammodramus savannarum) and Chestnut-collared Longspurs (Calcarius ornatus)). During 1990, we continued monitoring and management efforts for rare, threatened and endangered grassland birds in southwestern Manitoba. Efforts focused upon collection of trend and baseline data to determine the current status of these species, assessing limiting factors and productivity, gaining a better understanding of movements, winter range and non-nesting mortality rates through additional banding of juveniles and some adults, public education and landowner awareness, protection of critical sites, Burrowing Owl reintroductions (from Saskatchewan), and installation and monitoring of Ferruginous Hawk nesting structures.

METHODS

Field work was conducted from 9 April to 17 August, 1990. The nesting distribution of Ferruginous Hawks was primarily assessed during April; by mid-April, budding leaves make bluffs hard to see through and by the last week in April nests become difficult to spot (especially those in aspen or willow clumps). During the last week in April, Ferruginous Hawk surveys were further complicated by an influx of subadult hawks and the initial arrivals of Swainson's Hawks (Buteo swainsoni). This year, for the first time, a motor-bike was used to survey large inaccessible grassland areas; despite excellent coverage of many previously unchecked areas, no new nesting sites were found as a result of this coverage. By May, most of the artificial nest structures installed from 1987-1989 had been checked and more than half of the 1990 Ferruginous nests had been located. As in previous years, nests were not approached during this period to avoid abandonment. Because identification of nest occupants needs to be done with a spotting scope from a distance (usually at least 0.5 km), many Ferruginous nests were not verified until May. By the end of May, however, all except one of the Ferruginous Hawk nests that were found during 1990 had been verified. Nest checks were initiated in early June to obtain data on early productivity and food habits; at this time considerable care was taken to visit nests only if young were obvious. Banding of Ferruginous Hawk immatures took place from 14 June to 24 July. Ferruginous nest structures were erected throughout the summer, but most were installed during early August.

Burrowing Owl nesting surveys were conducted from early May to early June and consisted of visits to historic sites, follow-up of public reports, talking to landowners wherever feasible, and scanning suitable pastures in non-traditional areas. Playback of taped Burrowing Owl calls was used to draw nesting adults out of their burrows and thus facilitate sightings (most pairs respond to the tape with threat displays, calling back and occasionally flying towards the observers). Playback can even be used to elicit responses at night; on 9 May we recorded one owl in a new site at about 23:00 hours and had another owl in a known site fly in (calling) at midnight and again at 2:00 the following morning. By the last week in May and in early June, some pairs still responded to taped calls, but most no longer exhibited any visible response. Over 70% of the active burrows were found during May, however nests

continued to be located throughout June and July. Release pen construction and site preparations occurred during late June. Owls for the release were obtained in the Regina/Moose Jaw area from 3-6 July. These owls were placed in the release pens and were fed mice daily until they were released on 26 July. Thereafter, they were observed and fed regularly at the release site until mid-August. Burrowing Owl young from natural burrows were captured in one-way traps at the burrow entrance and banded from 4-24 July. Adults were captured and banded throughout the nesting season with a modified Potter's trap (designed by Dennis Meyer, St Paul) baited with live lab mice. Males were particularly responsive to this trap earlier in the nesting season, while the females were incubating; females were captured after they and the young had emerged from the nest burrow.

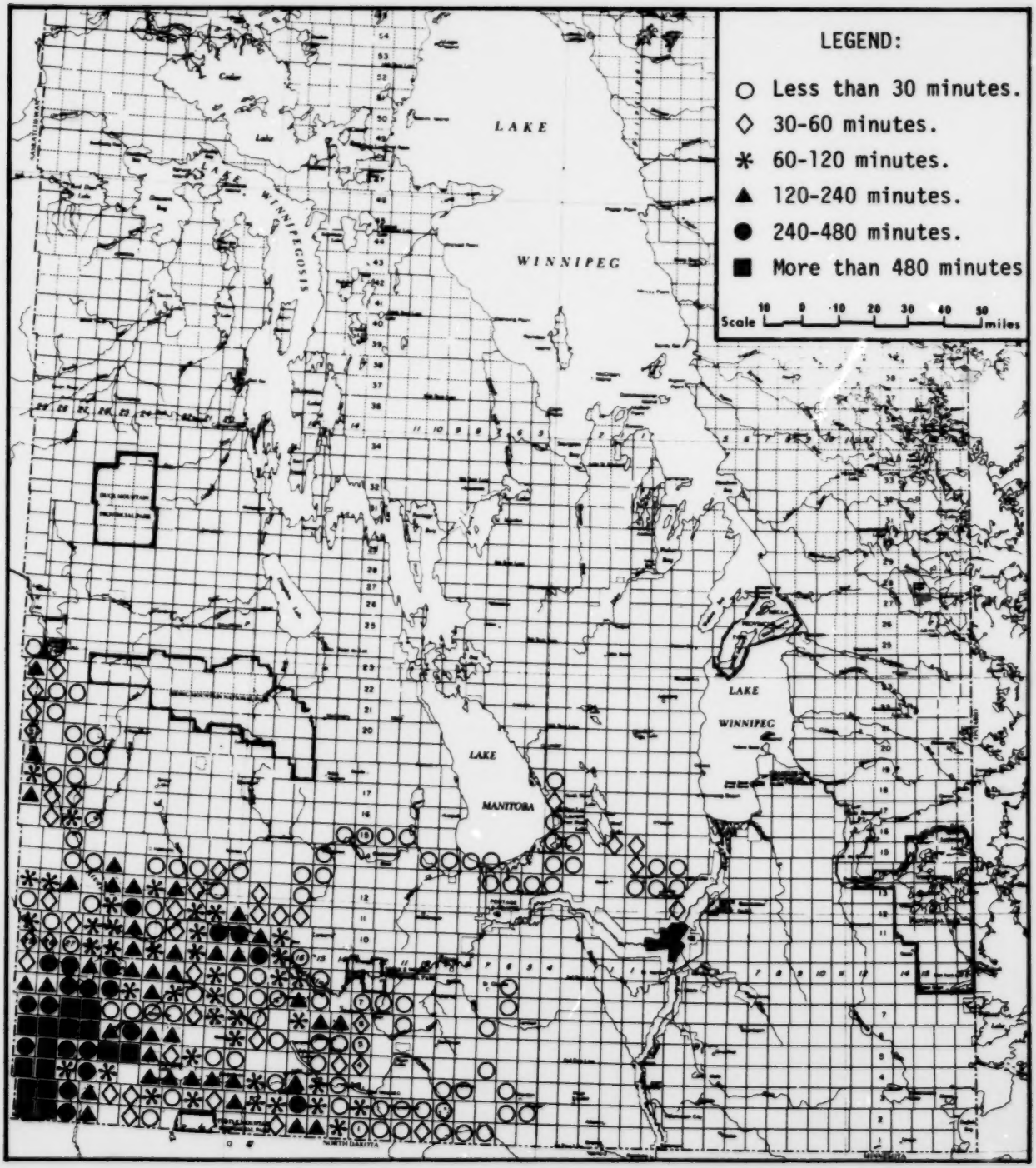
Intensive surveys and nest searches for Loggerhead Shrikes took place from 5-29 June, during which time three-quarters of the 1990 nests were located. Although shrike young were banded until 1 August, 80% were banded from 12-31 June. Several adults were also caught in the Potter's trap and banded. Although males can be caught and banded during incubation, care must be exercised not to catch the incubating female (one nest was deserted during 1990 after we accidentally caught an incubating female). Observations of Baird's Sparrows were usually made incidental to other field work in the southwest. On 15 June, a 1988 survey route was resurveyed; this route was designed to monitor Baird's densities in the southwest. Nest drags and banding of Baird's Sparrow immatures took place from 7-17 August.

RESULTS AND DISCUSSION:

a) Area coverage

The amount of time spent in each township was recorded throughout the early summer. From April through June, nearly 550 hours were spent in surveys and related field work. During July and August, only time spent in infrequently visited townships (9 hours) was recorded. The extent of these surveys is revealed in Figure 1 and Appendix I. Endangered grassland bird surveys were conducted in a total of 255 townships; 102 of these townships were visited for less than 30 minutes, 39 for 30-60 minutes, 39 for 1-2 hours, 40 for 2-4 hours, 20 for 4-8 hours, and 15 for more than 8 hours. Most of the field efforts were conducted in the extreme southwest (48 townships south and

Figure 1. Survey effort during the 1990 field season based on the amount of time spent (in minutes) in individual townships.



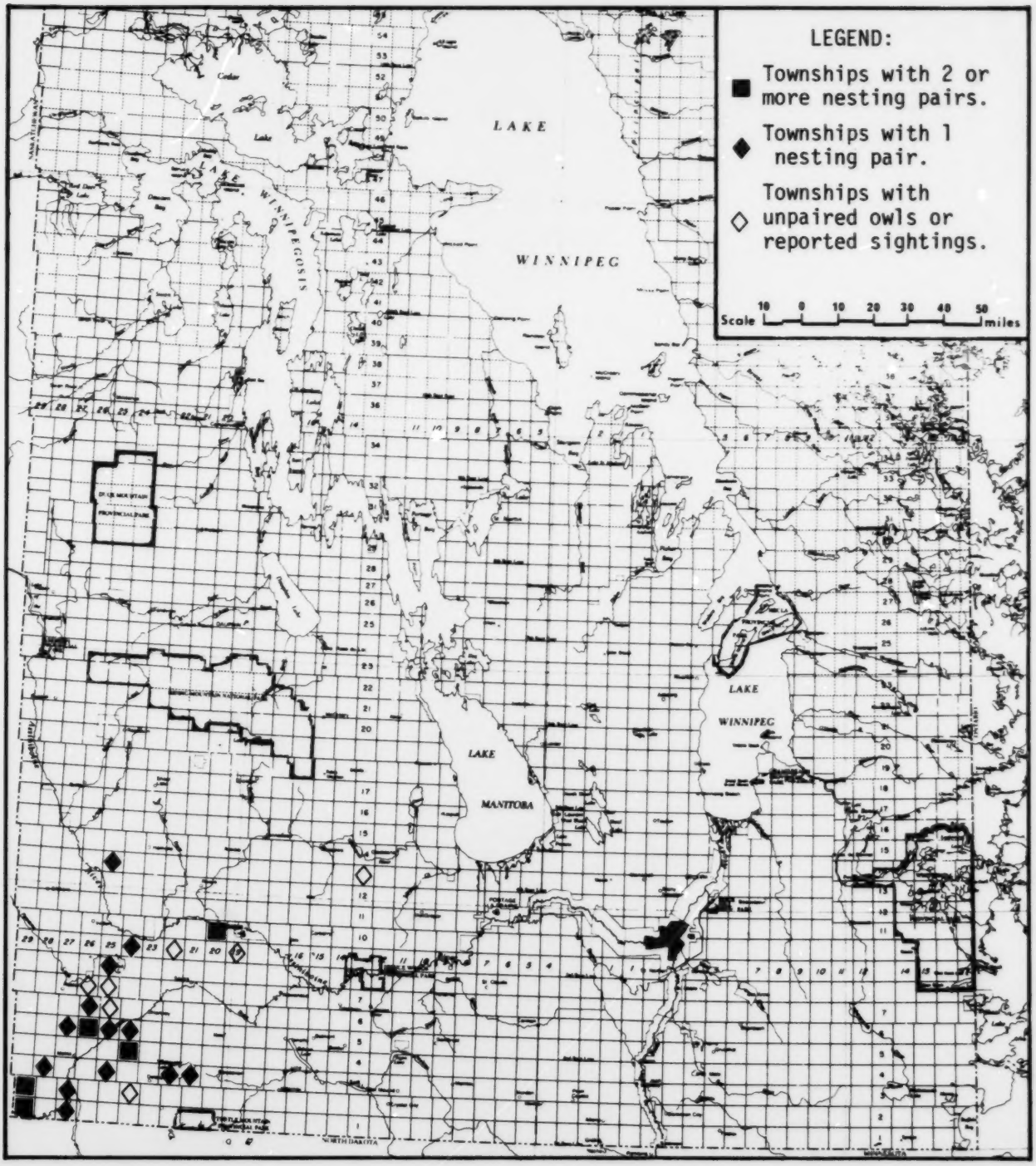
west of township 8-24 near Oak Lake); more than half of these townships were surveyed in excess of 4 hours. During April, however, 68% of the surveys were conducted in townships outside of the extreme southwest, including coverage north and east to Russell, Rivers, Shilo, Glenboro and Manitou, plus a band of townships north and west of Winnipeg (Fig. 1). Field efforts and time spent in the extreme southwest increased from 32% in April, to 64% in May, and 84% in June; nest checks and banding efforts in June contributing to additional time being spent in the extreme southwest where most of the nests were located. During July and August, the proportion of time spent in the extreme southwest was even greater.

b) Burrowing Owl

Burrowing Owls were first noted in the study area on 24 April; on this date George Turnbull reported that both pair members at 29-4-24 returned overnight. An unusually late sighting was reported by Dave Johnson who saw two birds by a burrow on 12 November. Overall nesting populations of the Burrowing Owl in the province continue to decline. Despite similar effort to previous years, only 19 nesting pairs and 7 single adults (presumably unpaired) were found in 1990 (Appendix II). This compares to 34 nesting pairs found in 1989 and 28 pairs, 6 singles during 1988. Several other potential nesting sites for 1990 were reported after the field season or the birds left before the sighting could be verified (Appendix III). Despite intensive surveys and extension efforts in southern Manitoba, we estimate that less than half of the pairs that nest in the province during any year are found. Pairs can be extremely difficult to locate; some sites where owls were eventually found had been scanned several times prior to the birds being seen. Added to that, many landowners guard the locations of Burrowing Owls on their property for fear the owls may be disturbed.

The breeding distribution of Burrowing Owls during 1990 extended north and east to Miniota and Kemnay (near Brandon) (Fig. 2). Five pairs were in one township (5-26). Twelve of the 34 nesting sites from 1989 were reoccupied. Even though use of traditional sites was disappointingly low (especially since four of these sites were reoccupied only briefly by a single adult), percentages were still greater than the 7 of 34 sites that were reused from 1988 to 1989. Ten of the 1990 sites were found while scanning suitable

Figure 2. Distribution of Burrowing Owl nesting records and sightings in Manitoba during 1990.



pastures in previously unoccupied areas. Four sites were originally reported by landowners or interested observers. These results illustrate the importance of combining surveys in previously unoccupied areas with checks of traditional sites and follow-up of public reports.

Nesting success during 1990 was high as 17 of the 19 known pairs were successful (Appendix II). Despite three small broods of 1-3 young, four broods of 8 and one of 9 young resulted in an average brood size of 5.8 young at fledging (well above the 1982-1989 average of 4.4 young per brood). At least 99 young fledged; 93 of these were caught and banded with United States Fish and Wildlife Service (USFWS) aluminum bands over a blue numbered plastic band on the left leg and were color-marked with fast-drying fluorescent orange paint on the primaries. Color-marking of the young, although designed to increase reporting rates on the wintering range, also assists in determining family sizes. On several occasions during 1989 and 1990 when we were certain that all the young from a burrow had been caught and banded, the color-marking allowed us to identify one or more unbanded juveniles. An additional 11 adults were caught and banded with red and white numbered plastic bands over a USFWS aluminum band on the left leg during 1990.

Return rates for previously banded adults and juveniles were monitored. Of 40 adults checked for bands in 1990, 14 had been previously banded including 10 adults (5 females and 5 males) that were banded as adults in 1989, three females that were banded as juveniles in 1989 (all three were successful producing 20 young!) and one male that had been banded as a juvenile in 1988. The three returning juveniles from 1989 was the highest return rate we have ever observed; nevertheless, considering that 132 young (including 23 reintroduced owls) were banded at fledging age in Manitoba during 1989, this is still a low return rate for juveniles. All returning adults were found within 1 km of their 1989 nest site. The lone exception was a female observed at 9-3-22 (52 km SE of where it nested in 1989) one day after a banded female (probably the same one) had been seen at this owl's 1989 nest site the previous day; neither site was active thereafter. Of 12 successful pairs that had been banded in 1989, seven pairs failed to return, two pairs returned to the same nesting territory, one female returned but was only seen on one occasion and two males returned and nested with a different mate. Of 6 females and 2 males that were banded at other successful sites

during 1989, only 2 females and 1 male returned. Two other banded males from unsuccessful 1989 nests failed to return. Hence, of 34 banded adults from 1989 (mostly at successful nests) only 10 returned in 1990. Although some may have returned and went unnoticed, the low return rates of juveniles and adults suggests that post-breeding and winter mortality may be a major factor in recent declines of the species.

In contrast to adults, returning juveniles were invariably found at considerable distances from where they were banded. Three females that had been banded as juveniles in 1989 nested 43 km ENE, 62 km NE and 67 km N of where they were raised; a male banded as a juvenile in 1988 nested 78 km NE of its natal site. Three other nesting adults in Manitoba during 1988 and 1989, including two males banded as juveniles in Manitoba and one female from Saskatchewan, also exhibited movements from their natal areas of 39-350 km.

During July, 48 juveniles and 4 adults from Saskatchewan were released in southwestern Manitoba. These owls were captured in the Regina, Moose Jaw and Weyburn areas from 3-6 July and placed in seven preconstructed pens in extensive pastures near Broomhill (SW16-5-27). So as not to impact populations in Saskatchewan, only partial families were removed at each site. At Moose Jaw, for instance, we accompanied a banding crew and took young from broods that had more than five young. In other sites, young were captured using one-way traps similar to those used during banding operations. Released owls were banded, color-marked and fed mice on a daily basis. On 26 July, the pens were removed. Several media personnel, including two television crews, and about 30 local enthusiasts were on hand to capture the event. Feeding continued until mid-August at which time examination of pellets and daily observations suggested that they had switched to a primarily grasshopper diet. Given that twice as many young were released than in previous years, yet only two young were known to have perished (both were found dead in the vicinity of the pens after the release), the release was considered very successful.

c) Ferruginous Hawk

Efforts to locate Ferruginous Hawks were intensified in 1990. A much earlier start to the field season (April 9) and use of a motor bike in relatively inaccessible areas resulted in greater confidence in population estimates. A total of 56 nesting pairs were found (Appendix IV); this was up

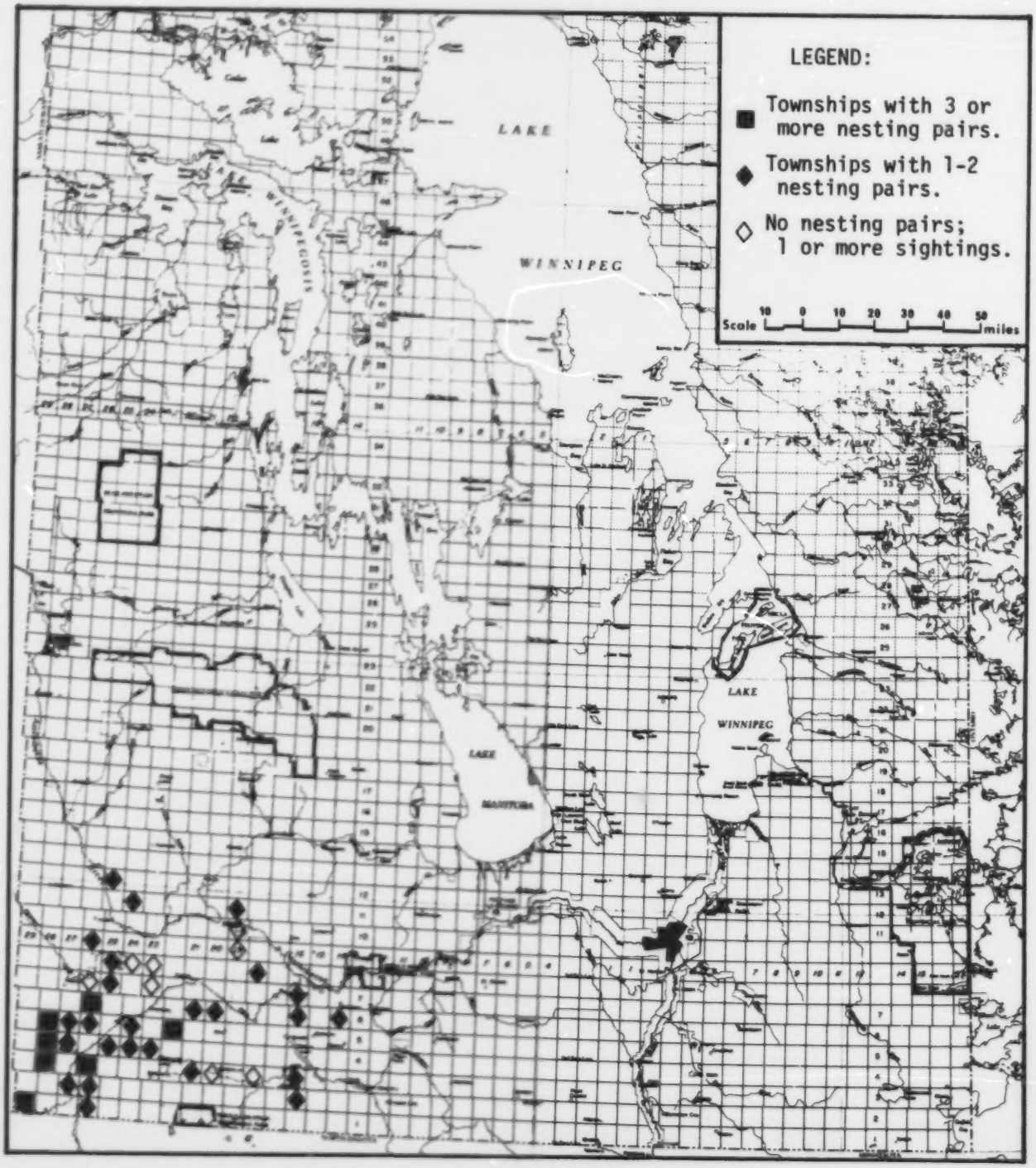
from a previous high of 35 pairs in 1989. In addition to nesting pairs, adults and subadults were observed in 20 other locations (Appendix V). Based on the extent of these surveys, the provincial population of Ferruginous Hawks is estimated to be less than 75 nesting pairs.

The northern limits of the 1990 breeding range extended to north of Lenore and Brandon (where three nesting pairs were located) (Fig. 3). On the eastern edge of the range, nesting territories from 1988 near Treesbank and Hilton were reoccupied, a new nesting site was found near Glenboro, and two new nests were found near Holmfield. Nesting densities were up in all regions. The number of nests in the extreme southwest (townships 26-29, ranges 1-5) increased from 17 in 1989 to 26 in 1990; nests in the periphery (north and east of Brandon) increased from 2 to 10; nests in the Napinka-Chain Lakes region (townships 22-25, ranges 4-5) increased from 7 to 10; nests in the Pipestone-Oak Lake region (townships 24-26; ranges 6-9) increased from 6 to 7. Half of the 1990 territories were in new sites, 18 were nests occupied for one or more year from 1987-1989 (including 14 that were last occupied in 1989), and 10 were within 1 kilometer of an unoccupied 1988 or 1989 nest.

Food items were found during 20 of 48 nest visits during 1990. Among 47 remains found, 75% were Richardson's ground squirrels (Spermophilus richardsoni), 17% were northern pocket gophers (Thomomys talpoides), 4% were thirteen-lined ground squirrels (S. tridecemlineatus) and 4% were bird remains. These results are very similar to 1989 percentages. During 1989 food items (n=21) were found on 12 of 29 nest visits and included Richardson's ground squirrels (67%), northern pocket gophers (19%), thirteen-lined ground squirrels (5%), birds (5%) and 5% were meadow voles (Microtus pennsylvanicus). In contrast, 30 food items from 1988 included a greater percentage of northern pocket gophers (37%) and a hare (Lepus spp.).

Nesting losses during 1990 were higher than normal as 29 of 56 pairs failed to fledge young (Appendix IV). Because most of the nests were located early in the nesting cycle, many failures were recorded that might have otherwise gone unnoticed; if nest searches are delayed until May or June, many initiated nests have already failed and may not be found. Many of the losses were attributed to unstable nests blowing down or the young falling out and poor nest attentiveness by inexperienced nesting pairs. Depredation by Black

Figure 3. Distribution of Ferruginous Hawk nesting records and sightings in Manitoba during 1990.



billed Magpies (Pica pica) may also be a factor as pairs nesting in the vicinity of active magpie nests almost always failed (often at or near hatching). Aided by three pairs that each fledged five young (only recorded once in Manitoba prior to this year) and 10 pairs that fledged four young, a total of 83 young were fledged (3.1 per successful nest or 1.5 per initiated nest). Productivity was especially low on the periphery of the range, where 40% of the nests were successful but only one of ten nest produced more than 1 young and overall productivity for these nests was 0.8 young/nest.

During 1990, 78 young were banded with a USFWS aluminum band on the right leg and a numbered yellow leg jess on the left. Most were also color-marked with fast-drying fluorescent orange paint on the underside of tail and selected flight feathers. Of 50 Ferruginous Hawks (mostly breeding adults) studied well enough to feel confident of banding status, only one was banded -- a male that nested near Hilton, 120 km east of where it was banded as a nestling in 1988. This was, however, the first recorded instance of a juvenile from Manitoba returning to nest.

Perhaps the most encouraging sign during 1990 was the use of nine nest structures. Seven of these had been installed in 1989 (one wooden platform, one modified Great Horned Owl (Bubo virginiatus) nest and five stick bases), one was a platform erected by Brandon Regional staff in 1987, and one was a platform erected in 1983 by Brian Ratcliff. During the 1990 field season, 30 additional nest structures were erected and three failed Ferruginous nests were repaired (Appendix VI). As in 1989, nest structures were situated in isolated or semi-isolated trees, some branches were trimmed from the tree to present the occupants a better view of the surrounding terrain, and abundant twigs (often an old magpie nest) were added for nest materials. This year, for the first time, nesting structures were constructed from 2-inch wire mesh; these structures were not only easier to erect but result in a superior final product.

d) Loggerhead Shrike

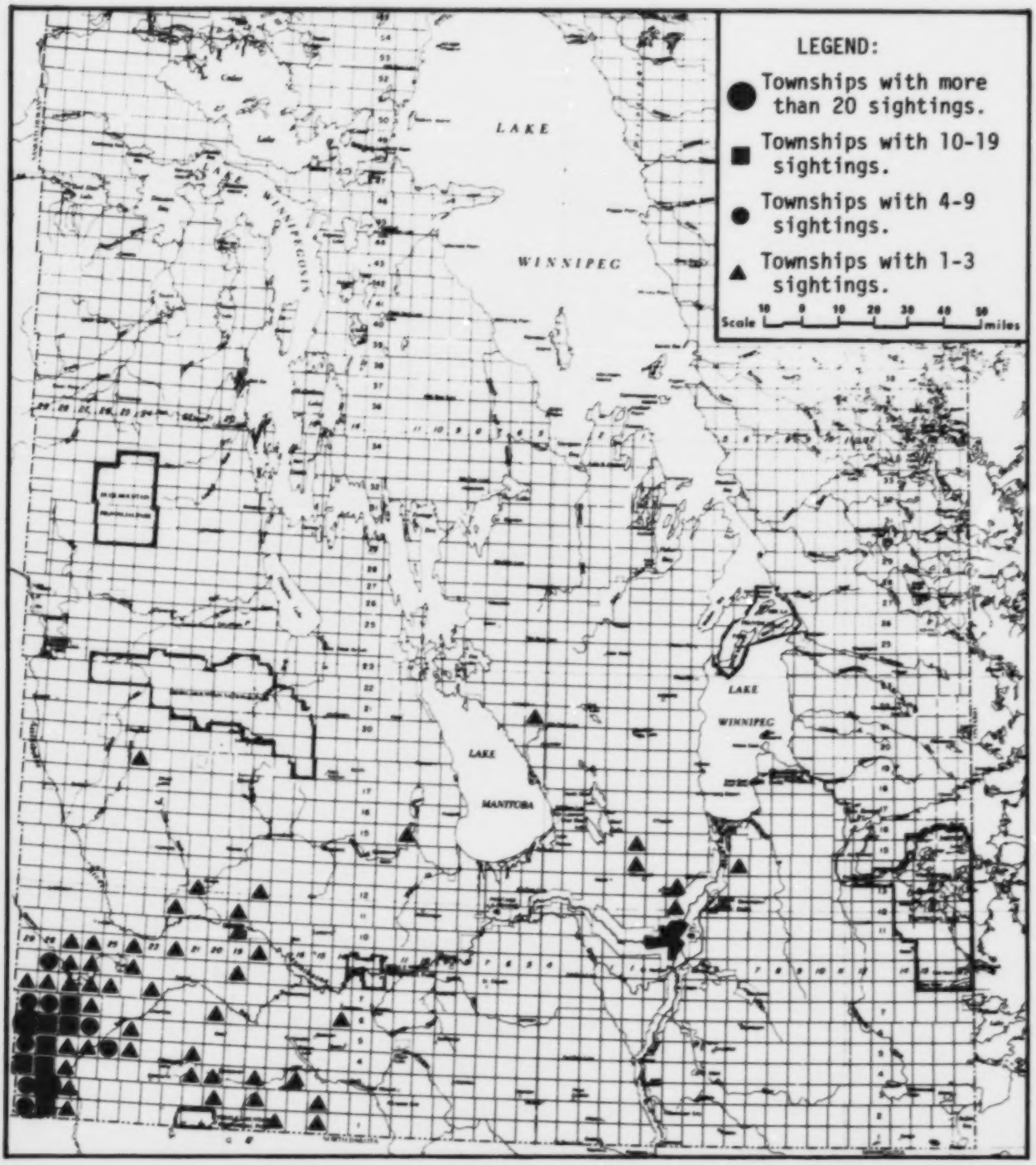
Loggerhead Shrikes were first observed in southeastern Manitoba on 23 April, 1990. In southwestern Manitoba, they were first seen on 1 May. During 1990, we located 251 Loggerhead Shrike pairs or territorial adults in southern Manitoba; 19 others were reported (Appendix VII). The 270 total pairs is

comparable to totals from 1987 to 1989 (232-265 pairs). This apparent consistency is due to increased effort, refinement of survey techniques and increased reporting rates. Based on numbers in some southwestern townships that have been checked on an regular basis, shrike populations are believed to have declined by at least 50% since 1987. The overall population for Manitoba is probably fewer than 500 pairs. As in other years, few shrikes were noted outside of the extreme southwest; 84% of the sightings from 1990 were south and west of Oak Lake and 43% were within seven contiguous grassland and shelterbelt-dominated townships in the extreme southwest (townships 1-29, 1-28 to 5-28, and 5-27) (Fig. 4). During the 1990 nesting season, Loggerhead Shrikes were observed north and east to Shoal Lake (township 18-24), Deerhorn (21-5W), Balmoral (15-1E), and Tyndall (14-6E).

During 1990, 154 nests were found (up from a previous high of 106 nests located during 1989). This increase also reflects refined survey techniques and increased effort during the peak nesting period. When initially found, 90 of the nests contained eggs, 10 contained viable eggs and young, 37 had young (some of these also contained inviable eggs), 11 had fledged young nearby, and 6 were failed nests (Appendix VII). Complete clutches ranged from 4-10 eggs ($\bar{X}$=6.3) in 68 clutches that were known to be complete. Four nests contained 8 eggs (only recorded twice in previous years) and one contained 10 eggs (unfortunately, this nest failed soon after hatching).

Among 90 nests monitored from the egg stage till fledging, 59 (66%) were successful producing 318 young. This represents an average fledging success of 5.4 young/successful nest or 3.5 young/initiated nest. Post-fledging mortality rates are still unknown and are nearly impossible to monitor without radio-telemetry. These losses may, however, be an important limiting factor and account for the low return rates despite productivity that appears elevated. As in 1989, several days of wet and windy weather during mid-June contributed to many complete and partial pre-fledging losses. These losses were again prevalent in open nest situations, particularly nests located in open willows within extensive grasslands. Consequently, productivity and overall nesting populations have declined in the extensive grassland-dominated townships (formerly considered the heartland of their provincial range), whereas populations are faring much better in townships that were previously considered suboptimal (those with abundant hedgerows but virtually no

Figure 4. Distribution of Loggerhead Shrike sightings in Manitoba during 1990.



grasslands).

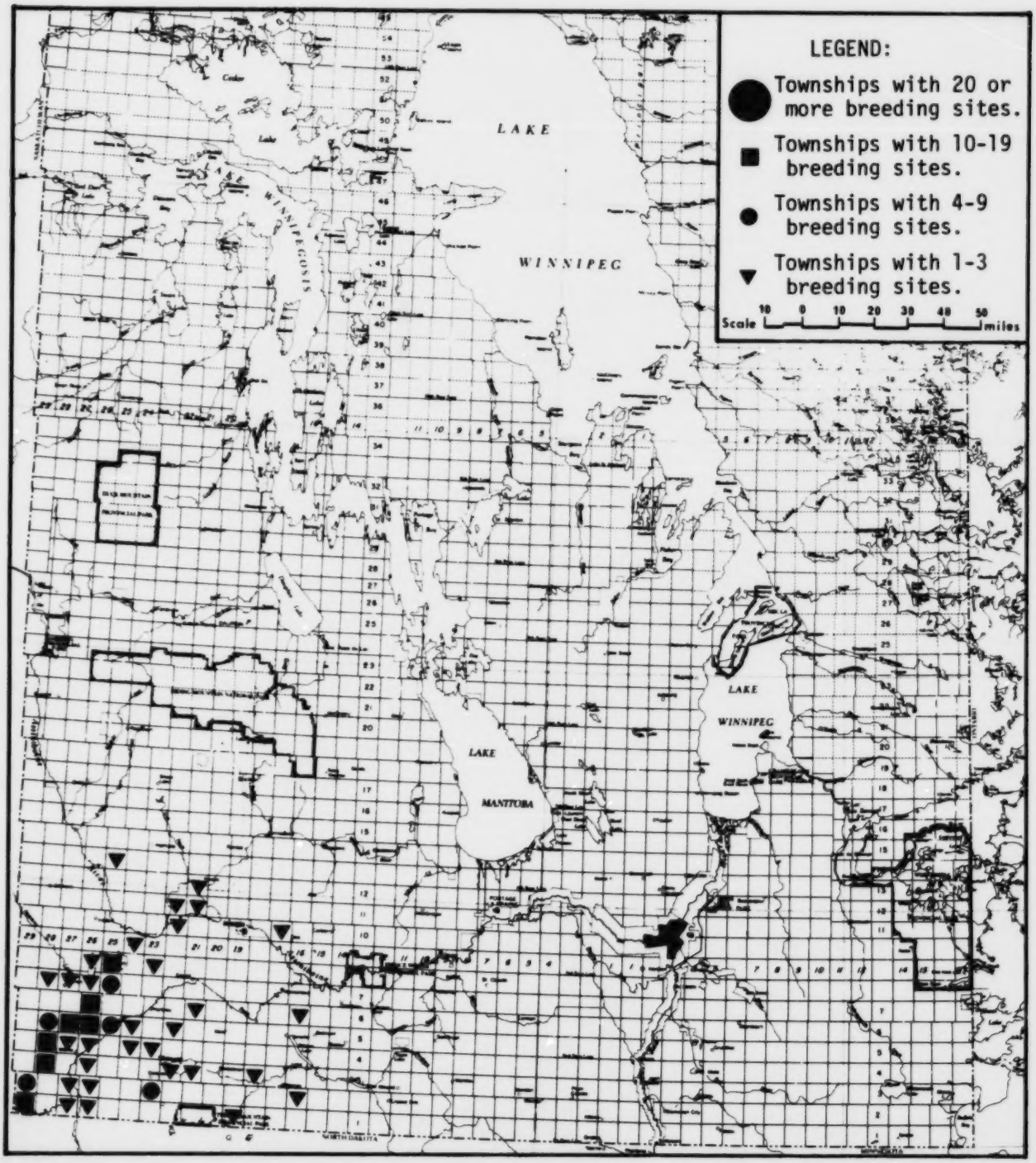
A total of 542 nestling shrikes were banded during 1990 with a red/white plastic band over USFWS aluminum on the right leg; three previously unbanded adults were banded red plastic over aluminum on right and white/red plastic on left. The number of juveniles banded in 1990 was up from previous totals of 95, 352, and 401 banded in 1987-1989. This year, for the first time, one family group was banded near Winnipeg; populations in southeastern Manitoba are sparsely distributed and probably belong to the more threatened L. l. migrans subspecies. Of at least 309 adults checked for bands, 8 (3%) were previously banded. These included three that had been banded as nestlings in Manitoba during 1989, four Manitoba nestlings from 1988 and one of unknown status (bore only an aluminum band). Two adults that had only aluminum bands were later caught and found to have lost their plastic bands since 1988. One nesting female was retrapped 3 km from its 1988 natal site; nesting males were found 12 km and 34 km from 1988 natal sites and 2 km from a 1989 natal site.

e) Baird's Sparrow

Baird's Sparrows consistently arrive in southwestern Manitoba during the second week in May; during 1990 they were first noted on 11 May. Baird's Sparrow were found at 164 sites during 1990; a total of 280 singing males were noted (Appendix VIII). This compares to a high of 264 sites (460 adults) in 1988 and 218 sites (321 adults) during 1981. During these three years the breeding range has also shrunk; during 1990 Baird's were observed north and east to Rivers, Shilo and Holmfield (Fig. 5). None were noted in southeastern or southcentral Manitoba. A return to more normal precipitation patterns across the Northern Great Plains was considered primarily responsible for observed declines since 1988. Populations of other irruptive species such as the Lark Bunting (Calamospiza melanocorys), while down from 1988 and 1989 levels, were still well above normal in 1990. Since the Baird's Sparrow also seems to be irruptive, but to a lesser degree, we expect populations to return to more normal levels when drought conditions subside elsewhere in the Northern Great Plains.

On 15 June, we resurveyed a 66 mile (106 km) Baird's Sparrow route through prime grassland habitat from the extreme southwest to Oak Lake. This route had originally been surveyed on 15 June, 1988. As in 1988, 2 minute

Figure 5. Distribution of the Baird's Sparrow in Manitoba based on 1990 sightings.



stops were made every 0.5 mile (0.8 km); the survey was conducted from 05:15 to 12:00 hours. During 1990, 36 Baird's were heard; less than half the 80 noted in 1988. Thirteen were found in essentially the same sites (within 100 m) as in 1988, the other 23 were in new sites. This attests to how vagrant the species is from year to year.

During 1990, 62% of the Baird's observations were in pastureland, 31% were in haylands (including 15% in brome/alfalfa), 5% were in idle areas and 3% were in cropland (Appendix VIII). Since much of our field-work is in pastured sites, however, actual habitat preferences may be quite different. Along the survey route, for instance, 47% of the Baird's occurred in pastureland, 33% were found in haylands, and 19% were in idle areas. Given similar habitat along this route as in 1988 (38% cropland, 34% pasture, 23% hayland and 5% idle), the greatest densities occurred in idle areas (1/59 hectares), followed by haylands (1/156 hectares) and pasture (1/162 hectares). None were found in 3143 hectares of cropland along the survey route!

Increased singing activity among Baird's Sparrows was noted in late July -- probably indicating initiation of second clutches. On 7-15 August, nest drags were conducted in several nesting sites to monitor nesting chronology and late nesting ecology. Fourteen Baird's Sparrow nests were located, along with five Grasshopper Sparrow, four Savannah Sparrow (Passerculus sandwichensis) and two Sprague's Pipit nests. Eight of the Baird's nests still contained eggs; these included six clutches of 4 eggs, one of 3 eggs and one with 1 egg. The 1-egg clutch was unusually late as it was still being incubated when the site was revisited on 23 August!. The other nests hatched and most fledged young prior to mid-August. A total of 22 Baird's Sparrow nestlings were banded with USFWS aluminum on the right leg and a red/white plastic band on the left leg.

f) Special Conservation Efforts

Conservation efforts to maintain existing populations and preserve critical habitat include public education and landowner awareness programs, habitat assessment and stewardship programs, and preparation of National Recovery Plans. Heightened public awareness through tours of the grassland study area, involvement of local enthusiasts and landowners in banding operations and in day to day activities, distribution of fact sheets and

widespread media releases are all instrumental to the success of recovery efforts. A banded juvenile from Manitoba that turned up on an offshore drilling rig off the coast of Louisiana focused local and international attention on conservation strategies and on recent efforts to understand where Manitoba's owls are overwintering. During 1990, several additional parcels of critical grassland habitat in the southwest were leased through the Critical Wildlife Habitat Program. Alternative strategies to manage and conserve the mixed grass prairies of southwestern Manitoba are being explored. Department staff have been actively involved in the preparation of National Recovery Plans for threatened and endangered grassland birds; these Plans integrate national and provincial recovery goals and objectives. To stimulate reports of banded and color-marked birds, experts and amateurs throughout the wintering and migration range have been alerted to banding and color-marking schemes in Manitoba and notices have been published in prominent ornithological journals.

CURRENT STATUS:

Plans for 1991 call for additional involvement of graduate students and outside interest groups agencies in research and management of endangered grassland birds. We are exploring the possibilities of having students from the University of Manitoba, the Natural Resources Institute (U. of Manitoba), and the Rural Development Institute (U. of Brandon) involved in nesting ecology/habitat assessment/conservation studies on these four threatened grassland bird species. Buoyed by the success of nest structure installations for Ferruginous Hawks, we will be erecting additional structures in suitable grasslands in the southwest. Efforts to locate more nesting pairs of Burrowing Owls will be continued so that steps can be taken to secure vulnerable sites. We will also continuing discussions with landowners and municipalities to prevent spraying within the vicinity of active owl nests. Although we have not yet witnessed the return of a released owl to Manitoba, the high survival rate of young at release sites and recent successes of reintroductions in British Columbia (after several years of minimal returns) suggests that these releases should be continued in an attempt to replenish natural populations in the province. Because of recent concerns Saskatchewan has expressed over the state of their owl populations, we have begun

discussions with North Dakota, exploring the feasibility of obtaining birds from North Dakota in return for assistance in development of survey techniques in the state. Efforts to conserve present populations of Loggerhead Shrikes in Manitoba include discussions with several municipalities on local habitat protection strategies such as the "Roadside Conservation Corridors" program. As in other jurisdictions, we are attempting to solve the rather puzzling decline of the Loggerhead Shrike across its entire North American range. During 1991, we will be conducting additional shrike monitoring in southeastern Manitoba; these populations belong to the more endangered eastern subspecies which has been severely reduced or extirpated in several provinces and states. Manitoba will be taking a lead role in the development of a prairie-wide census for the Baird's Sparrow in 1992; we will also be initiating studies on Baird's Sparrow habitat preferences, productivity and limiting factors.

SUMMARY

Surveys during 1990 revealed a further decline in breeding Burrowing Owl populations (from 34 nesting pairs in 1989 to 19 in 1990), increased Ferruginous Hawk populations (56 nesting pairs; up from a previous high of 35), and a slight decline in breeding Loggerhead Shrike and Baird's Sparrow populations. Productivity among Burrowing Owls was high as 17 pairs were successful and 99 young fledged (93 of these were banded and color-marked). More than one-third of the adult Burrowing Owls had been previously banded including four that were banded as immatures in Manitoba during 1988 and 1989. For the fourth successive year Burrowing Owls were obtained from Saskatchewan and reintroduced in extensive pastures of southwestern Manitoba; the 1990 release involved twice as many birds (48 juveniles and 4 adults were released at Broomhill). Thirty additional nesting structures for Ferruginous Hawks were erected during 1990; nine structures were used by Ferruginous Hawks during 1990. Ferruginous Hawks experienced low nesting success; 27 pairs were successful producing 83 young, 78 of which were banded and color-marked. At least one of the nesting Ferruginous Hawks bore bands identifying it as a bird that had been banded as a nestling in 1988. A total of 154 Loggerhead Shrike nests were found and 542 young were banded. We were encouraged to find that 3% of the adults shrikes seen during 1990 had been banded as nestlings in

previous years. Nest drags in August turned up 13 Baird's Sparrow nests some of which still contained eggs or very small young in mid-August. Twenty-two Baird's young were banded.

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APPENDIX I. Survey effort based on total time (in minutes) spent in each township during April-June, and time spent in new or seldom visited townships in July-August, 1990.

Township	April 8-30	May 1-15	May 16-30	June 1-15	June 16-30	July-Aug.	Total
12-3E	-	-	-	40	-	-	40
13-3E	-	-	-	20	-	-	20
14-3E	20	-	-	-	-	-	20
13-2E	-	-	-	10	-	-	10
14-2E	15	-	-	-	-	-	15
13-1E	-	-	-	10	-	-	10
14-1E	15	-	-	20	-	-	35
15-1E	25	-	-	10	-	-	35
15-1	45	-	-	-	-	-	45
14-3	3	-	-	-	-	-	3
15-3	20	-	-	-	-	-	20
13-4	9	-	-	-	-	-	9
14-4	18	-	-	-	-	-	18
15-4	12	-	-	-	-	-	12
16-4	25	-	-	-	-	-	25
17-4	35	-	-	-	-	-	35
18-4	5	-	-	-	-	-	5
2-5	15	-	-	-	-	-	15
13-5	10	-	-	-	-	-	10
2-6	5	-	-	-	-	-	5
3-6	15	-	-	-	-	-	15
7-6	-	-	8	-	-	-	8
8-6	-	-	7	-	-	-	7
13-6	15	-	-	-	-	-	15
1-7	-	-	-	-	-	10	10
4-7	-	-	15	-	-	-	15
6-7	-	-	5	-	-	-	5
13-7	8	-	-	-	-	-	8
14-7	5	-	-	-	-	-	5
1-8	-	-	-	-	-	15	15
3-8	-	-	15	-	-	-	15
14-8	5	-	-	-	-	-	5
1-9	-	-	-	-	-	15	15
2-9	-	-	11	-	5	-	16
3-9	-	-	-	-	-	10	10
14-9	7	-	-	-	-	-	7
1-10	-	-	-	-	-	35	35
2-10	-	-	6	-	15	-	21
14-10	13	-	-	-	-	-	13
1-11	-	-	-	-	-	10	10
2-11	-	-	6	-	10	-	16
6-11	-	10	-	-	-	-	10
7-11	-	10	-	-	-	-	10
15-11	27	-	-	-	-	-	27
1-12	-	-	-	-	-	10	10
2-12	-	-	7	-	-	-	7

7-12	-	10	-	-	-	-	10
15-12	5	-	-	-	-	-	5
1-13	-	-	-	-	-	15	15
2-13	45	-	22	-	-	-	67
4-13	-	50	-	-	-	-	50
5-13	-	10	-	-	-	-	10
6-13	15	15	-	-	-	-	30
7-13	-	-	10	-	-	-	10
15-13	12	-	-	-	-	-	12
1-14	-	-	-	-	75	15	90
2-14	15	-	7	-	-	-	22
3-14	-	5	-	-	-	-	5
4-14	-	55	-	-	-	-	55
5-14	-	20	-	-	-	-	20
6-14	90	20	60	-	30	-	200
15-14	23	-	-	-	-	-	23
1-15	-	-	-	-	90	42	132
2-15	10	60	6	-	-	-	76
3-15	-	72	-	-	-	-	72
4-15	-	5	-	-	-	-	5
5-15	-	20	-	-	-	-	20
6-15	85	35	45	-	30	-	195
7-15	27	-	-	-	-	-	27
8-15	15	-	-	-	-	-	15
13-15	7	-	-	-	-	-	7
14-15	10	-	-	-	-	-	10
1-16	-	-	-	-	110	18	128
2-16	57	120	15	-	60	5	257
3-16	35	95	-	-	-	-	130
6-16	25	-	40	-	35	-	100
7-16	55	-	30	-	92	-	177
8-16	70	-	10	-	8	-	88
9-16	26	-	-	-	-	-	26
11-16	30	-	-	-	-	-	30
12-16	10	-	-	-	-	-	10
13-16	3	-	-	-	-	-	3
1-17	-	-	-	-	55	-	55
2-17	5	65	10	-	-	10	90
3-17	-	8	-	-	10	-	18
5-17	-	25	-	-	-	-	25
7-17	10	-	-	-	-	-	10
8-17	33	-	10	-	21	-	64
9-17	63	-	-	-	8	-	71
10-17	78	-	-	-	22	-	100
11-17	5	-	-	-	-	35	40
2-18	-	65	20	-	-	20	105
3-18	50	30	-	-	22	-	102
5-18	-	55	-	-	-	-	55
6-18	-	10	-	-	-	-	10
7-18	10	-	-	9	-	-	19
8-18	-	-	12	-	-	-	12
9-18	92	-	165	-	-	-	257
10-18	98	-	70	-	9	-	177
11-18	-	-	-	-	18	25	43
12-18	-	-	-	-	45	-	45

2-19	40	52	35	-	48	18	193
3-19	130	20	-	-	5	-	155
4-19	-	20	-	-	-	-	20
5-19	-	64	-	-	-	-	64
6-19	-	60	-	-	-	-	60
7-19	5	10	-	10	-	-	25
8-19	15	-	-	-	-	-	15
9-19	78	25	100	-	-	-	203
10-19	74	55	110	-	60	-	299
11-19	30	-	20	-	75	25	150
13-19	5	-	-	-	-	-	5
2-20	-	15	10	-	-	17	42
3-20	130	88	-	-	8	-	226
4-20	-	7	-	-	10	-	17
6-20	-	65	-	14	-	-	79
7-20	-	65	-	-	-	-	55
8-20	45	-	45	-	-	-	90
9-20	120	-	28	-	-	-	148
10-20	10	-	265	-	-	-	275
11-20	24	-	-	-	10	30	64
12-20	16	-	-	-	-	-	16
13-20	35	-	-	-	-	-	35
2-21	-	30	45	-	-	-	75
3-21	40	5	75	-	-	-	120
4-21	-	58	-	-	25	-	83
6-21	10	20	-	20	-	-	50
7-21	-	25	-	-	-	-	25
8-21	25	5	15	-	-	-	45
9-21	15	-	52	-	-	-	67
10-21	-	-	55	-	-	25	80
11-21	30	-	-	-	10	45	85
12-21	37	-	-	-	12	-	49
13-21	5	-	-	-	-	-	5
2-22	-	18	10	-	-	-	28
3-22	35	30	80	-	-	-	145
4-22	5	30	-	-	10	-	45
5-22	135	10	-	62	-	-	207
6-22	10	-	-	5	-	-	15
7-22	-	30	30	-	-	-	60
8-22	60	40	45	-	-	-	145
9-22	-	-	80	-	-	45	125
10-22	32	-	5	-	-	5	42
11-22	35	-	-	-	-	-	35
12-22	152	-	-	-	15	-	167
13-22	22	-	-	-	-	-	22
1-23	-	18	-	-	-	-	18
2-23	-	22	65	-	-	-	87
3-23	-	50	85	-	-	-	135
4-23	72	20	-	47	8	-	147
5-23	90	30	-	5	-	-	125
6-23	20	-	-	-	-	-	20
7-23	33	110	80	-	-	-	223
8-23	45	75	35	-	-	15	170
9-23	35	30	-	-	-	10	75
10-23	8	-	-	-	-	-	8

11-23	10	-	-	-	-	-	10
12-23	30	-	-	-	10	-	40
13-23	15	-	-	-	-	-	15
1-24	-	47	-	-	-	-	47
2-24	-	48	-	-	-	-	48
4-24	60	410	10	70	-	-	550
5-24	40	128	15	93	-	-	276
6-24	19	-	-	-	-	-	19
7-24	42	25	25	-	-	-	92
8-24	55	140	-	-	-	-	195
9-24	20	90	30	-	-	-	140
10-24	138	25	-	-	-	-	163
11-24	300	-	-	-	50	-	350
12-24	128	-	-	-	55	-	183
2-25	-	57	-	-	-	-	57
3-25	-	-	103	-	12	-	115
4-25	40	280	225	80	40	-	665
5-25	25	52	20	105	-	-	202
6-25	10	-	-	-	-	-	10
7-25	171	-	225	-	-	-	396
8-25	95	-	220	-	-	-	315
9-25	60	15	15	-	-	-	90
10-25	35	43	-	-	2	-	80
11-25	30	42	-	-	24	-	96
12-25	120	57	-	-	54	-	231
13-25	59	-	-	-	95	-	154
1-26	110	-	55	-	-	-	165
2-26	95	17	85	-	20	-	217
3-26	130	15	130	125	-	-	400
4-26	20	170	35	40	10	-	275
5-26	105	350	290	152	139	-	1036
6-26	215	95	200	115	15	-	640
7-26	136	-	60	65	77	-	338
8-26	23	70	30	-	21	-	144
9-26	10	30	-	-	37	-	77
10-26	20	55	-	-	12	-	87
11-26	20	-	-	-	-	-	20
13-26	10	-	-	-	-	-	10
15-26	5	-	-	-	-	-	5
18-26	10	-	-	-	-	-	10
19-26	10	-	-	-	-	-	10
1-27	50	-	85	45	100	-	280
2-27	145	15	90	25	75	-	350
3-27	30	10	19	40	10	-	109
4-27	15	150	30	58	22	-	275
5-27	217	225	387	447	227	-	1503
6-27	25	10	70	337	224	-	666
7-27	-	33	139	20	62	-	254
8-27	-	35	165	-	75	-	275
9-27	-	-	5	-	-	-	5
10-27	7	45	-	-	-	-	52
12-27	152	-	-	-	-	-	152
13-27	28	-	-	-	-	-	28
14-27	15	-	-	-	-	-	15
15-27	48	-	32	-	-	-	80

16-27	45	-	-	-	-	-	45
17-27	11	-	-	-	-	-	11
18-27	10	-	-	-	-	-	10
19-27	27	-	-	-	-	-	27
21-27	7	-	-	-	-	-	7
1-28	-	132	100	325	115	-	672
2-28	-	33	369	405	240	-	1047
3-28	115	95	293	715	202	-	1420
4-28	215	110	225	722	430	-	1702
5-28	65	80	300	610	176	-	1231
6-28	28	10	-	185	129	-	352
7-28	20	-	-	76	99	-	195
8-28	80	-	-	222	166	-	468
9-28	40	-	-	10	-	-	50
10-28	10	-	-	-	-	-	10
11-28	45	-	-	-	-	-	45
12-28	60	-	-	-	-	-	60
15-28	30	-	-	-	-	-	30
16-28	45	-	-	-	-	-	45
17-28	6	-	-	-	-	-	6
20-28	8	-	-	-	-	-	8
21-28	10	-	-	-	-	-	10
22-28	30	-	-	-	-	-	30
23-28	20	-	-	-	-	-	20
1-29	160	60	270	458	185	-	1133
2-29	65	140	113	266	165	-	749
3-29	-	20	-	222	467	-	709
4-29	-	-	20	138	108	-	266
5-29	-	-	460	214	394	-	1068
6-29	-	-	25	197	124	-	346
7-29	25	-	-	52	53	-	130
8-29	47	-	-	-	7	-	54
9-29	42	-	-	-	-	-	42
10-29	85	-	-	-	-	-	85
11-29	7	-	-	-	-	-	7
12-29	90	-	-	-	-	-	90
16-29	120	-	-	-	-	-	120
17-29	80	-	-	-	-	-	80
18-29	125	-	-	-	-	-	125
19-29	43	-	-	-	-	-	43
20-29	55	-	-	-	-	-	55
21-29	30	-	-	-	-	-	30
22-29	185	-	-	-	-	-	185
23-29	5	-	-	-	-	-	5
TOTALS:	8439	5536	6942	6916	5604	515	33437

APPENDIX II. Burrowing Owl nesting and banding data, 1990

Location	Comments	Max. No. Yg	No. Banded Yg.	No. Banded Ads.
PAIRS				
SW 16-10-20 (N pair)		3	3	M**
NW 22-3-21		1	1	F
NE 15-4-24		8	8	M*,F**
NE 29-4-24		6	6	M*,F**
NW 4-9-24	Pair present until late June. Unsuccessful	0	0	-
NW 28-3-25	Pair present until late June. Unsuccessful	0	0	-
NE 27-5-25		8	8	M*,F*
SW 20-13-25		8	8	F**
NW 5-5-26		4	4	F
NW 7-5-26		7	7	-
NW 19-5-26		8	8	M,F*
NE 31-5-26		7	1	F
SE 34-5-26		9	9	M,F
SE 23-1-27		5	5	M*,F*
NE 17-2-27		5	5	M
NE 16-3-28		6	6	M
NW 13-1-29 (S)		7	7	M
NW 13-1-29 (N)		6	5	M
NW 22-2-29		4	2	M*,F
SINGLE BIRDS				
SW 16-10-20	(S)Lone male seen on several occasions (May-June).			-
SW 9-3-22	Banded female from NW27-6-26 seen (18 May). Not seen after			-
SE 3-5-24	Banded female from 1989 seen (10 May). None seen after.			F*
SW 9-8-25	Adult (male?) present at 1988 & 1989 nest site (July-August).			-
NW 27-6-26	Banded female from 1989 seen (17 May). None seen after.			F*
NW 6-5-27	Adult heard calling in dark (9 May). Not located after.			-
NW 34-2-29	Adult present at 1989 nest site (late April-early May).			-

OTHER POTENTIAL SITES BASED ON RELIABLE REPORTS (SEE APPENDIX III)

NE 19-13-10, SE 15-9-19, SE 4-9-22, NE 34-2-24, NE 15-4-24 (E), NE 11-6-25, SW 27-7-25, SE 29-7-25, NE 9-8-25, NW 17-8-26, NW 34-1-29.

* Banded as an adult during 1989.
** Banded as a juvenile during 1988 or 1989.

APPENDIX III. Unverified 1990 Burrowing Owl reports and previously unrecorded historic sites.

NE 19-13-10	Mike Paryniuk observed 2 along drainage ditch dike (Sept 15-30, 1990).
SE 15-9-19	Family group reported in farmyard pasture in 1989 & 1990. Reported after 1990 field season.
SW 30-3-20	Landowner said a family group was present in 1988. Also present there in previous years. None in 1989 and 1990.
SW 17-4-20	One reported in early June (1990) by hole along unimproved road allowance. Couldn't find later.
SE 18-3-21	Landowner (P. Dyck) observed one by a burrow in stubble field in spring, 1990.
SE 4-9-22	D. Johnson reported a pair standing by a burrow in alfalfa field on 12 Nov.!, 1990. Observer has seen species before.
SW 1-8-23	Landowner said a pair were in a burrow in pasture here 5-6 years ago.
NE 34-2-24	S.C. Hobbs (landowner on site) reported hearing 3 Burrowing Owls one evening in May, 1990. Report received after field season.
NE 15-4-24	Landowner (G. Wallace) said that birds were present in a pasture E of yard and calling at a pair W of yard during June (1990). Also reported a pair in hayland in SW 22-4-24 during early July. Since pasture SE of yard was worked up, burrow may have been destroyed.
NE 11-6-25	Earl Charles reported a pair on a burrow in pasture for 3 days during mid-May, 1990.
SW 27-7-25	Kris Kaasgard (lives at SE33) has seen B. Owls on Knoll in hayland in SE corner of quarter for several years prior to 1990 but not checked in 1990. Reported in fall 1990.
SE 29-7-25	Kris Kaasgard observed 2-3 B. Owls on a knoll in hayland during July, 1990. Not reported till fall, 1990.
SE 6-8-25	K. Kaasgard observed 3 on a burrow in hayland during late summer, 1989.
NE 9-8-25	J. Barre (landowner) spotted 2-3 B. Owls in well-grazed pasture in July, 1990. Report received in fall, 1990. Site had been scanned on several occasions earlier in summer but since owls were 1 km from road, they may have been missed.

NE 35-1-26	Jeff Canon (Waskada) reported a pair in grassy strip on 13 May (1990) but couldn't locate birds afterward.
NE 8-8-26	Dave Braddell passed on a report of a Burrowing Owl in a cultivated field in August 1990.
NW 17-8-26	Frank DuBarr (Virden) reported a pair in good pasture on 25 August (1990). Pasture had been checked several times earlier in the summer so birds may have been transients.
NE 29-3-28	Dog trainer (Holman) reported seeing a family group in pasture 2-3 years ago.
SW 31-9-28	Bob Clark observed 1 in a slough bottom of wheat field in early June (1990). General area and site sounds unsuitable, but observer familiar with the species.
NW 34-1-29	Rick Kilfoil reported seeing 1 by burrows in SE corner of hayfield (adjacent extensive pasture) during July (1990). Also thought he had seen some there in 1989.
NE 28-18-29	Pasture manager recalled seeing a family group by burrow in 1986.

APPENDIX IV. Ferruginous Hawk nesting and banding data in Manitoba, 1990.

Location	Nest tree or shrub	Tree hgt. (m)	Nest hgt. (m)	Nest width (cm)	Nest depth (cm)	Total # yg seen	# yg. fledged	# yg. banded
WC 27-6-14	Willow	10.5	7.0	81.3	38.1	0	0	0
NE 1-2-16	Aspen	9.1	5.2	73.7	40.6	1	1	1
SE 1-3-16	Willow	3.7	2.4	2.5	71.1	2	1	1
NE 25-6-16	Aspen	4.2	2.7	94.0	43.2	2	0	0
SE 28-7-16	Cottonwood	15.2	8.4	80.0	38.1	2	0	1
NW 28-9-18	Aspen	10.7	9.1	73.7	40.6	5	5	5
NW 33-9-18	Aspen	7.6	10.7	-	-	0	0	0
EC 5-11-19	Maple	12.2	8.5	82.6	63.5	2	1	1
NC 20-6-20	Maple	12.2	5.8	66.0	40.6	0	0	0
WC 7-3-21	Cottonwood	15.2	13.7	-	-	0	0	0
C 14-6-21	Aspen	7.9	7.0	68.6	48.3	4	4	4
NC 6-5-22	Cottonwood	15.2	13.6	63.5	50.8	5	5	4
WC 8-5-22	Maple	4.6	3.0	88.9	48.3	0	0	0
SW 21-5-22	Green Ash	12.2	8.4	54.6	48.3	0	0	0
C 35-5-22	Cottonwood	12.2	7.2	66.0	25.4	4	4	4
WC 33-4-23	Elm	7.6	6.4	86.4	61.0	4	4	3
C 15-4-24	Elm	12.2	6.7	82.6	55.9	1	1	1
SE 25-4-24	Maple	4.6	4.1	-	-	0	0	0
SW 2-5-24	Maple	7.0	6.1	86.4	66.0	3	3	3
SW 8-5-24	Maple	7.9	7.0	80.0	53.3	1	0	0
NW 19-11-24	Aspen	6.7	6.6	88.9	43.2	0	0	0
NE 14-4-25	Maple	10.7	7.6	78.7	63.5	4	4	3
SW 10-7-25	Maple	12.2	10.5	-	-	0	0	0
NW 15-7-25	Maple	6.5	4.9	94.0	55.9	4	4	4
SW 18-8-25	Willow	3.7	3.4	-	-	0	0	0
NE 26-12-25	Maple	7.6	5.2	71.1	50.8	0	0	0
SW 19-1-26	Maple	7.6	3.8	76.2	40.6	0	0	0
NW 31-2-26	Green Ash	3.4	2.9	78.7	38.1	0	0	0
SW 6-3-26	Elm	6.7	6.1	77.5	40.6	1	1	1
NW 9-3-26	Maple	5.5	3.7	73.7	61.0	4	3	3
SW 17-3-26	Green Ash	6.1	2.7	53.3	53.3	4	4	4
NC 10-5-26	Willow	4.3	3.0	-	-	3	0	0
SW 24-6-26	Cottonwood	14.0	3.5	111.8	101.6	3	3	3
C 31-6-26	Willow	4.6	4.1	78.7	78.7	0	0	0
SE 35-6-26	Aspen	7.6	5.5	81.3	48.3	4	4	4
SE 15-9-26	Willow	3.0	2.7	88.9	38.1	0	0	0
SE 24-2-27	Elm	9.1	5.7	83.8	71.1	0	0	0
C 31-4-27	Cottonwood	16.8	10.6	94.0	63.5	4	2	1
SW 12-5-27	Maple	6.9	3.4	90.2	58.4	0	0	0
NE 19-5-27	Aspen	11.4	7.6	94.0	38.1	2	2	2
NE 5-3-28	Cottonwood	16.8	13.7	77.5	35.6	5	5	5
NW 8-3-28	Aspen	7.6	7.3	71.1	40.6	0	0	0
SE 16-3-28	Cottonwood	16.8	13.9	76.2	58.4	3	3	3
NW 30-3-28	Aspen	12.1	11.3	81.3	48.3	4	3	3

C 33-3-28	Cottonwood	15.2	9.6	73.7	55.9	4	4	2
NC 9-4-28	Aspen	9.1	5.2	73.7	45.7	4	4	4
SW 12-4-28	Maple	9.1	7.5	61.0	40.6	0	0	0
NE 22-4-28	Cottonwood	18.3	8.5	86.4	33.0	0	0	0
NE 23-4-28	Willow	3.7	2.4	76.2	43.2	0	0	0
SW 28-4-28	Aspen	10.7	9.1	94.0	91.4	0	0	0
NE 2-5-28	Cottonwood	16.8	13.4	76.2	83.8	4	4	4
SC 3-5-28	Aspen	11.9	11.3	66.0	34.3	2	1	1
SW 4-5-28	Aspen	4.4	4.3	71.1	33.0	0	0	0
NE 12-1-29	Cottonwood	15.2	6.6	72.4	35.6	0	0	0
SE 23-1-29	Maple	6.1	4.3	73.7	25.4	3	3	3
NE 29-1-29	Aspen	7.6	6.4	76.2	50.8	0	0	0

APPENDIX V. **Details of Ferruginous Hawk sightings during 1990 (excluding sightings within 2 km of active nests).**

Location	Comments	Date
S 13-1-7	A.& D.Schritt observed 13 Ferruginous (and 6730 Red-tails) in migration along the Pembina River. Ferruginous were observed on March 26 (4), 27 (1), & 30 (2), April 13 (1), 15 (2), & 18 (3). None were seen on March 29 & 31, April 1, 7, 14 & 22.	March 26-April 22
NW 29-3-18	Adult soaring over good hunting pasture.	July 23
NE 23-9-19	Pair in hayland. Flew off to NE.	April 9
SW 34-10-19	2 over pasture. Later one in SW 34 & one in NE 34.	May 22
SE 18-3-20	Adult in good hunting pasture.	July 16
SE 21-3-20	Adult in good hunting pasture.	April 12
NE 16-7-23	D. McBurney observed pair here for 3 weeks.	April
SW 1-8-23	Adult in good hunting pasture.	May 31
SW 11-8-24	Adult in pasture; seen earlier in NE14, NE15 & SW14.	May 3
E 31-8-24	One observed by D. Hatch & M. Siepman.	June 20
WC 6-7-25	One on post adjacent hayland.	June 15
SW 28-7-25	Three adults in good hunting pasture.	May 31
NW 9-8-25	One in good hunting pasture.	May 23
NE 8-6-26	One in good hunting pasture. Later in SW 16.	April 17
SE 29-6-26	Subadult (light colored legs) observed over pasture.	May 31
SE 33-6-26	Adult flew over road; then flew S over NE 28.	April 18
SE 24-7-26	Adult in good hunting pasture; later in SW 19-7-25.	May 23
SW 11-4-28	Adult and 2 unmarked immatures (possibly the 2 unmarked young from 33-3-28) observed in pasture.	August 7
SE 35-4-28	Historic nest (<1987) in willow along trail.	
SW 13-1-29	Subadult observed in a cultivated field.	May 30

APPENDIX VI. Ferruginous Hawk structures erected or nests repaired during 1990.

Location	Type of structure	Structure height (m)	Tree/shrub height (m)	Substrate/ situation
NEST STRUCTURES ERECTED				
NC 29-3-18	old magpie nest	3	3	Isolated willow
WC 15-3-20	old Swainson's nest	6	9	Aspen; end of hedgerow
C 23-8-24	old magpie nest	5	10	Aspen in open bluff
NE 18-4-25	wire basket	10	17	Isolated cottonwood
NW 7-1-26	old magpie nest	6	9	Isolated aspen
EC 19-2-26	old magpie nest	5	8	Maple/shrub clump
NW 30-2-26	wire basket	7	7	Isolated maple
SE 14-4-26	old Swainson's nest	6	9	Isolated maple
C 10-5-26	wire basket	9	15	Isolated cottonwood
NW 18-5-26	wire basket	6	8	Aspen & willow clump
NW 5-4-27	wire basket	6	15	Isolated cottonwood
CW 5-5-27	wire basket	8	11	Semi-isolated maple
NW 10-5-27	old Swainson's nest	8	11	Aspen in small bluff
NE 16-5-27	wire basket	6	11	Isolated balsam poplar
SW 22-3-28	wire basket	4.5	6	Maple; old yardsite
SE 28-3-28	wire basket	8	15	Isolated cottonwood
NW 1-4-28	wire basket	9	12	Isolated cottonwood
NE 23-4-28	wire basket	6	8	Isolated willow tree
SW 29-4-28	wire basket	9	12	Aspen in open bluff
C 3-5-28	wire basket	10	17	Isolated cottonwood
SW 5-5-28	wire basket	8	9	Aspen in small bluff
SC 10-5-28	wire basket	8	15	Isolated cottonwood
SW 14-5-28	wire basket	6	8	Isolated willow tree
NE 23-5-28	wire basket	12	17	Isolated cottonwood
SE 27-1-29	wire basket	6	8	Isolated elm
C 33-1-29	wire basket	6	12	Isolated cottonwood
SW 35-1-29	wire basket	7	9	Open aspen bluff
NC 24-3-29	wire basket	6	17	Cottonwood; old yard
NW 9-5-29	old magpie nest	6	9	Isolated aspen
NW 29-17-29	old magpie nest	6	9	Aspen; edge of bluff
REPAIRED NESTS				
SW 21-5-22	failed Ferruginous Hawk nest from 1990.			
SW 10-7-25	failed/ fallen Ferruginous Hawk nest from 1990.			
SC 15-5-27	failed Ferruginous Hawk nest from 1989.			

APPENDIX VII. Loggerhead Shrike observations during 1990 including nesting and banding data.

Location	Observers/comments	Dates (eggs)	Dates (young)	No. young banded
NE 1-14-6E	R. Koes, P. Taylor (June-July; pair and 2+ yg seen)			
NE 7-12-3E	R. Koes	June 11 (4)	July 13 (6)	6
SE34-13-3E	D. Fast (mid-May; 1 seen)			
SW35-6-2E	J. Morgan (Aug 17; 1 seen - migrant?)			
SE 2-11-2E	J. McNabe (May 16; 1 seen)			
N 27-10-1E	G.Grieef, W.Johnson, D.Richards (Aug 15; 2-4 birds seen)			
NE24-14-1E				
NE34-14-1E				
SW12-15-1E	D. Fast (mid-May; pair seen)			
SW11-21-5	K. Gardner (31 May; 1 seen)			
NW11-15-11				
SE14-6-14				
NE20-1-15				
SW 5-2-15	R. Parsons (June 16; 1 seen)			
SE33-3-16				
SW 2-1-17	R.Parsons	June 19 (6)	July 9 (0)*	
NE 2-1-17				
NE21-2-18			Aug 13 (1+ fledged)	
NE30-3-18			June 15 (1** + 5)	5
NE26-9-18				
SW12-12-18	P. Stone		June 25 (7)	7
NE34-8-19	M. Anderson (5 Aug; 2 seen)			
NE 7-10-19	D. Barnes (June-July; pair seen)			
SE32-10-19			June 22 (6)	6
NW 5-11-19	D.Chranowski (June 14; 1 seen)			
SE 8-11-19			June 22 (7)	7
SW23-2-20				
NW27-3-20	J. Christie (June 16; 1 seen)			
NW 4-6-20	J. Christie (June 16; 1 seen)			
SE18-3-21				
SW32-4-21			June 19 (6)	6
SW16-12-21	N. Short (July 10; 1 seen)			
NW16-12-21	N. Short (July 10; pair seen)			
NE23-12-21	N. Short (early July; 1 seen)			
SE27-9-22	J. Horton		July 30 (3+ fledged)	
SW27-9-22	J. Horton (26 & 30 June; pair and 3+ yg seen)			
NW2-11-22				
NE11-7-23				
SE26-4-24			July 24 (1+ fledged)	
SW23-5-24				
SE34-8-24				
NW13-9-24			June 22 (4)	
SE28-18-24	K. Belcher (early Aug; 4 birds seen)			
SE 7-4-25				
SW 9-4-25	(initial)	June 7 (6)	June 28 (0)*	
	(renest)	June 28 (5)	July 17 (5)	5

SE14-4-25			July 17 (3+ fledged)	
SE16-4-25		May 29 (6)	June 28 (0)*	
SW17-4-25				
NW23-4-25				
SW34-4-25				
NE21-7-25				
SW 4-4-26				
SW34-4-26				
NW 5-5-26		June 7 (6)	June 21 (6), Jn 28 (4)	4
SW10-5-26			July 17 (1+ fledged)	
NW10-5-26			July 12 (3+ fledged)	
NW14-5-26				
NE17-5-26		My 22 (6+), My 31 (7)	June 19 (7)	7
NW19-5-26		June 6 (6 eggs/1 yg)	July 25 (2+ fledged)	
NE20-5-26		June 7 (6)	Jn 21 (1**+4),Jn 27 (2)	2
NE22-5-26				
NW28-5-26		Jn 6 (6),Jn 21 (2e,4yg)	Jn 26 (1**+4)	4
NE19-6-26			July 19 (1+ fledged)	
NW31-6-26	(initial)	June 6 (6)	June 27 (0)*	
	(renest)		July 26 (4)	4
SE35-6-26				
NE 6-7-26			June 6 (6), June 20 (5)	5
NW 6-7-26		June 6 (6)	June 20 (5)	5
SE12-7-26			July 27 (1** + 3)	3
NW17-8-26				
SW 9-9-26	D. Chranowski (31 May; 1 seen)			
SW17-1-27	(initial)		June 28 (0)*	
	(renest)	June 28 (7)	July 10 (1** + 6)	6
			June 27 (2** + 4)	4
NE 8-2-27				
SE 9-3-27		June 7 (7)	June 20 (7)	7
SW30-3-27				
NW 7-4-27				
NW31-4-27			July 12 (1+ fledged)	
NW14-5-27				
SW15-5-27				
NE16-5-27				
WC17-5-27	(initial)	My 16(0),My 17 (2),My 22(7),		
		My 24 (8),My 29 (8 deserted)		
	(renest)	Jn 13 (3), Jn 20 (4 deserted)		
	(renest)	July 8 (6)	July 17 (4), Jy 25 (0)*	
SW17-5-27			Jn 28 (2** + 2 fledged)	
NE17-5-27				
EC18-5-27		June 13 (1), Jn 20 (4)	July 8, 12 & 14 (4)	4
NE18-5-27		June 5 (7)	June 12 & 22 (2** + 5)	5
SW20-5-27				
SW21-5-27		June 5 (7)	June 13 & 21 (7)	7
SE22-5-27				
SW23-5-27			June 19 & 21 (6)	6
NE23-5-27		June 6 (7)	June 21 (2** + 5)	5
NW23-5-27				
NW26-5-27			June 13 (4+ fledged)	
SW27-5-27		June 6 (0),Jn 13 (4)	July 12 (6)	6
SW35-5-27			June 19 (6)	6
SE 3-6-27				

NE 3-6-27			June 5 & 13 (6)	6
NE 6-6-27		June 5 & 13 (5)	June 20 & 27 (5)	5
NC10-6-27			June 20 (6), Jn 27 (0)*	
SE15-6-27		June 5 & 6 (7)	Jn 13, 20 (6),Jn 27 (5)	6
NE16-6-27				
NW17-6-27		June 1 (1), Jn 13 (5)	Jn 27 (1e,3yg),Jy 12 (0)*	
SE18-6-27			Jn 13 (5), Jn 20 (2)***	2
NW23-6-27			June 20 (7)	7
SE24-6-27		May 17 (2), Jn 6 (6)	June 13 (1e,6yg), Jn 20 (2)***, Jn 27 (0)*	
NE25-6-27		June 6 & 13 (6)	June 20 & 27 (1** + 5)	5
SW 6-7-27				
SW13-7-27			June 20 (6)	6
SE14-7-27				
SE13-8-27				
SW 6-9-27	D. Chranowski		June 20 (6)	6
SW18-1-28				
NW18-1-28				
SE19-1-28	(initial)	May 17 (3), May 30 (0)*		
	(renest)	June 5 (7)	June 21 & 28 (7)	7
SW20-1-28		June 5 & 12 (7)	June 28 (6)	6
SW21-1-28				
SW22-1-28			June 12 (3)	3
SW23-1-28		June 7 (0), Jn 12 (3)	July 10 (0)*	
WC26-1-28				
SE27-1-28			June 28 (1+ fledged)	
NW29-1-28				
NE30-1-28		May 17 (7)	June 5 & 13 (7)	7
NW33-1-28				
NW36-1-28				
SW 2-2-28				
NW 5-2-28				
SE 7-2-28				
NE 7-2-28		June 5 (1), Jn 20 (7)	Jn 27 (2e,5yg),Jy 8 (2)***2	
NC 7-2-28			July 24 (1+ fledged)	
NW 8-2-28			July 20 (3+ fledged)	
NW16-2-28	(initial)	May 17 (2), May 30 (0)*		
	(renest)	July 10 (4)	July 24 (3)	3
SW17-2-28				
NE19-2-28				
SE20-2-28	(initial)	June 13 (6)	June 27 (0)*	
	(renest)	June 27 (4)	July 17 & 24 (5)	5
NE20-2-28				
NW22-2-28		My 17 (4),My 24 & 30 (7), June 7 (4-deserted)		
NE24-2-28				
NW24-2-28	(First nest)	May 24 (7)	June 21 (7)	7
	(Second nest)		July 31 & Aug 1 (5)	5
SC26-2-28		June 7 (6)	June 21 & 27 (6)	6
NE26-2-28		May 30 (6)	June 21 (4)	4
SE27-2-28				
NE27-2-28		June 7 (5)	June 21 (0)*	
NW27-2-28				
SW28-2-28		May 24 (6), May 30 (8)	June 21 (7)	7

NE30-2-28 (East)	June 7 (7)	June 21 (0)*	
NE30-2-28 (West)	June 5 (5)	June 21 & 27 (5)	5
NW30-2-28	May 30 (6), Jn 7 (6)	June 21 & 27 (6)	6
SE31-2-28 (East)			
SE31-2-28 (West)			
NW31-2-28	June 13 (7)	June 26 & 29 (1** + 5)	5
SW33-2-28			
NE33-2-28			
NW33-2-28	May 24 (7)	June 13 (7)	7
		July 12 (3+ fledged)	
NE 5-3-28			
NW 5-3-28 (initial)	May 30 (7)	June 20 (0)*	
(renest)	June 21 (8)	July 8 (7)	7
NW 7-3-28	July 8 (5)	July 25 (0)*	
SE17-3-28	June 26 (6)	July 12 (6)	6
SE18-3-28	June 21 (6)	July 8 (3), Jy 17 (1)	1
NW18-3-28		June 26 (1+ fledged)	
SE19-3-28 (initial)		June 7 (0)*	
(renest)	June 7 (6+)	June 21 (7), Jn 26 (6)	6
SW29-3-28			
NE30-3-28			
NW30-3-28			
SE31-3-28		June 21 (5)	5
SE33-3-28		June 21 (1** + 4)	4
NC 5-4-28		June 28 (5+ fledged)	2
NE 6-4-28			
NW10-4-28		May 24 (0)*	
SW12-4-28			
NW13-4-28	June 5 (1)	June 28 & July 8 (4)	4
SW15-4-28 (West)		June 28 (1+)	1
SW15-4-28 (East)	May 31 (3e, 3yg)	June 5 (6), Jn 13 (5)	5
NE16-4-28		June 13 (1** + 6)	6
NE20-4-28	May 31 & Jn 5 (7)	Jn 13(2e,5yg),Jn 21(1**+4)	4
NE21-4-28	June 7 (6)	June 21 & 28 (6)	6
NE23-4-28			
SW27-4-28			
SE28-4-28			
SW28-4-28		Jn 12 (1e,6yg),Jn 21 (7)	7
NE28-4-28		June 21 (7)	7
SE33-4-28			
SE34-4-28		Aug 2 (3+ fledged)	1
SW35-4-28		June 13 (6)	6
SW36-4-28	June 13 (4), Jn 28 (6)	July 12 (5)	5
NW 2-5-28	May 24 (5)	June 5 (0)*	
SE 4-5-28		June 5 (8), Jn 13 (0)*	
SE10-5-28		June 26 (6+ fledged)	2
NE10-5-28			
NE12-5-28			
SE15-5-28			
NE15-5-28			
NE17-5-28			
SW18-5-28			
SE19-5-28			
SW22-5-28 (initial)	June 6 (7), Jn 13 (7-deserted)		
(renest)		Jy 8 (2e,3yg),Jy 18 (5)	5

SW23-5-28		Jn 5 (1e, 6yg),Jn 14 (0)*	
SE23-5-28	June 13 (3e, 3yg)	June 25 (5)	5
NE23-5-28			
SW26-5-28	June 6 (7)	Jn 13 (7), Jn 21 (4)***	4
NW26-5-28			
WC26-5-28	June 6 & 13 (6)	June 25 (5)	5
NW35-5-28			
SW 2-6-28		June 26 (0)*	
NW 2-6-28	June 5 & 6 (18)	Jn 13 (3e, 7yg),Jn 19 (0)*	
SE 3-6-28		June 13 (0)*	
NW11-6-28			
SW22-6-28		June 26 (6), July 7 (0)*	
NW23-6-28			
SE27-6-28	June 13 (3e, 4yg)	June 26 (7)	7
NW27-6-28		June 26 & 29 (6)	6
SE28-7-28		June 26 (1** + 3-fledged)	
SE11-8-28	June 6 (7)	Jn 28 (1e,6yg), June 25 & 29 (7)	7
SW15-8-28			
NW15-8-28	June 6 (6)	June 28 & 26 (6)	6
SE17-8-28	June 6 (4e, 4yg)	June 28 (0)*	
NE10-1-29			
NW12-1-29			
SW16-1-29	June 7 & 12 (6)	June 28 (0)*	
NE16-1-29	June 7 & 12 (4)	June 28 (0)*	
SW23-1-29	July 10 (5)	Jy 24 (1e,4yg),Aug 1 (5)	5
SE23-1-29	June 5 (7)	June 12 & 21 (7)	7
NW35-1-29	June 5 & 12 (6)	June 28 (6)	6
WC22-2-29		July 18 (4+ fledged)	1
NW28-2-29	June 7 (7)	Jn 12 (3e,4yg),Jn 28 (6)	6
SW32-2-29		June 7 (7), June 12 (5)	5
NW34-2-29			
WC35-2-29	May 24 (7)	June 12 & 28 (7)	7
NW36-2-29	Jn 5 (4),Jn 13,21 (7)	June 29 (7)	7
NE 1-3-29		June 14 & 26 (2** + 2)	2
NW 1-3-29		June 29 (3+ fledged	
NW 9-3-29			
NW10-3-29		June 28 (6)	6
SE11-3-29	June 29 (1), Jy 18 (4)	Aug 1 (0)*	
SW12-3-29		June 7 (1+ fledged)	
SW13-3-29	Jn 5 (3),Jn 14,20 (5)	June 28 & 29 (5)	5
SE16-3-29			
SE23-3-29		June 29 (7), Jy 8 (0)*	
SW25-3-29		June 28 (6)	6
SE 1-4-29	June 13 (4)	June 29 (0)*	
SE 4-4-29		Aug 1 (3+ fledged)	
NE12-4-29	June 20 (1)	July 18 (2)	2
NE36-4-29 (South)	June 7 (0)	Jn 29 (3e,3yg),Jy 12 (6)	6
NE36-4-29 (North)	May 31, Jn 5 (7)	Jn 20 (7), Jn 26 (0)*	
SW 2-5-29	May 31 (5), Jn 7 (6)	June 28 & 26 (6)	6
NE 7-5-29	June 29 (0), Jy 12 (5)	July 25 (3)	3
NE 9-5-29		June 26 (1)	1
NE13-5-29		June 19 & 26 (7)	7
NE14-5-29			

SE17-5-29	May 31 (7)	June 20 (0)*	
SW18-5-29	June 6 (7)	June 19 (7), Jn 26 (0)*	7
SW21-5-29	May 31 (5)	June 19 (5)	5
SE21-5-29		June 19 & 26 (7)	7
SW23-5-29			
NE24-5-29	June 5 (6), Jn 19 (7)	June 26 & 29 (7)	7
SW27-5-29			
NE27-5-29	May 31 (5)	June 19 (6), Jn 26 (0)*	
NE28-5-29	June 10 (7)	June 14 (7), Jn 26 (5)	7
NW29-5-29			
NE30-5-29			
SW32-5-29		June 26 (5)	5
NE33-5-29	June 26 (1)	July 8 (0)*	
NW33-5-29			
SE36-5-29			
NW 8-6-29 (initial)		June 26 (0)*	
(renest)	June 26 (3)	July 8 (5), Jy 25 (4)	4
NE 8-6-29		July 12 (3+ fledged)	
SW16-6-29 (initial)	June 5 (5)	June 20 (0)*	
(renest)	June 26 (7)	July 8 & 12 (7)	7
SE17-6-29		July 25 (5)	5
NW24-6-29		June 29 (5+ fledged)	4
NW26-6-29			
NW 1-7-29			
NE 2-7-29	June 6 (7)	June 20 (6)	6
NE13-5-30	June 6 (2e, 4yg)	June 19 (0)*	
TOTALS:			
n = 260	n = 96		542

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* Evidence of depredation
** Addled egg(s)
*** Some young probably died from exposure to cool, damp weather

APPENDIX VIII. Baird's Sparrow, Grasshopper Sparrow, Spragues Pipit, and Chestnut-collared Longspur observations during 1990 (numbers seen or heard in parenthesis) and habitat (P=pastureland, I=idle, H=hayland, HA=alfalfa/brome hayland, C=cropland).

Location	Ba.Sparrow	Gr.Sparrow	Sp. Pipit	C.C.Longspur	Habitat
NW 2-16-4			Apr 24 (1)		P
SW26-6-14			May 22 (2)		P
NE11-16-14		Jn 25 (3)			P
NE11-6-15		Jn 25 (1)			I
NE20-6-15				May 22 (1)	P
NW21-6-15				Jy 23 (2)	P
SE29-6-15				Jy 23 (1)	P
NW10-8-15			Apr 24 (1)		I
NE 1-2-16	Jn 19 (1)				HA
NE24-3-16			May 1 (3)		P
NE25-6-16	Jn 23 (1)				P
NE21-7-16		Jn 25 (1)			H
NE21-8-16			Apr 24 (2)		I
NW30-8-16			Apr 24 (1)		H
SW14-10-17	mid-Jn (12)		mid-Jn (6)	mid-Jn(20)	P (M.Green)
NW29-3-18	Jy 23 (1)				P
SE26-9-18				May 23 (3)	P
NE34-9-18				May 23 (1)	P
NW34-9-18				May 23 (3)	P
SW35-9-18				May 23 (3)	P
NW3-10-18				May 23 (3)	P
SE4-10-18				May 23 (3)	P
NW4-10-18				May 23 (2)	P
SE9-10-18				May 23 (1)	P
NE36-1-19	Jn 22 (1)				(J.Horton)
SE17-9-19				May 22 (2)	P
SE10-3-20				May 25 (5)	P
NE18-3-20				May 11 (3)	P
NW18-3-20				May 11 (1)	P
SE19-3-20				May 11 (2)	P
SW20-3-20				May 11 (3)	P
SW21-3-20			May 11 (1)		P
SW30-3-20				May 11 (2)	P
SW13-8-20			May 22 (1)		P
NW25-8-20				May 22 (4)	P
NW17-3-21	Jy 16 (1)			Jy 16 (1)	P
NE21-3-21	Jy 23 (1)				P
SW21-3-21				Jy 16 (1)	P
NW22-3-21	Jy 16&23 (1)	Jy 23 (1)	Jy 16&23 (1)		P
SW14-6-21	Jy 9 (1)				C
NE29-11-21	Jn 20 (1)				P (N.Short)
SW 4-12-21	Jy 10 (2)				P (N.Short)
NE 9-12-21	Jn 20,Jy 10 (1)				P (N.Short)
SW 7-3-22				May 18 (1)	P

SW 9-3-22	May 18 (1)			May 18 (6)	P
NE20-3-22				May 11 (3)	P
NW 6-5-22	Jy 11 (1)				P
NE35-5-22	Jy 11 (1)	Jy 11 (1)			P
NW35-5-22				Jn 1 (2)	P
NE33-7-22			May 3 (1)		P
NE27-8-22			May 3 (2)		P
NW32-8-22			May 3 (1)		HA
NW32-10-22	Jy 10 (2)				P (N.Short)
SW 3-11-22	Jy 10 (3)				P (N.Short)
SW11-11-22	Jy 10 (2)				P (N.Short)
SE19-2-23	May 18 (1)			May 18 (5)	P
SW19-2-23	May 18 (1)			May 18 (12)	P
NE19-2-23				May 18 (1)	P
NW19-2-23				May 18 (10)	P
NE34-2-23	Jy 11 (1)	Jy 11 (1)		May 18 (3)	P
SE35-2-23	Jy 11 (1)			May 18 (4)	P
NE 1-3-23				May 18 (1)	P
SW 3-3-23				May 8 (8)	P
SE10-3-23				May 8 (1)	P
NW18-4-23	Jy 24 (1)			Jn 1 (7)	P
NE19-4-23	Aug 6 (1)				I
NE30-4-23				Jn 1 (7)	P
SW32-4-23				Ap17,Jn19 (2)	P
NW 1-5-23				Apr 17 (5)	P
NE16-5-23				May 11 (2)	P
NW16-5-23				May 11 (15)	P
SE21-5-23				May 11 (9)	P
SW21-5-23				May 11 (1)	P
NW36-7-23				May 31 (1)	P
SW 1-8-23				May 31 (4)	P
NW 5-8-23			May 3 (1)		H
SW18-8-23			May 3 (2)		H
NE30-8-23			May 3 (1)		H
NE35-8-23	Jy 30 (1)				P
SW 1-9-23			May 3 (1)		H
SE 3-9-23			May 3 (1)		P
SW15-9-23			May 3 (5)		H
SW11-4-24				May 8 (10)	P
NE11-4-24	Jy 24 (2)			May 10 (3)	P
SW12-4-24				May 8 (2)	HA
SE15-4-24				May 8 (4)	P
NE15-4-24	Jy 19 (1)		Jn 1 (2)	Jn 1 (3)	P
NW15-4-24			Jn 1 (1)	Jn 1 (2)	P
NE22-4-24				May 10 (6)	P
SE25-4-24				Jn 1 (2)	P
SW26-4-24				May 10 (1)	I
NE30-4-24				May 3&10 (6)	P
NE32-4-24	Jn 1 (2)		Jn 1 (1)	Jn 1 (10)	P
SW33-4-24			Jn 1 (1)	Jn 1 (4)	P
NW33-4-24			Jn 1 (1)	May 3&10 (10)	P
NE 4-5-24				May 10 (2)	P
SE 5-5-24				Jn 1 (2)	H
NE 5-5-24				May 10 (1)	P

NW 5-5-24			Jn 1 (1)	Jn 1 (3)	P
SE 8-5-24	Jy 11 (1)				HA
SW 8-5-24		Jy 11 (1)			HA
SW 8-5-24	Jn 1 (1)		Jn 1 (1)	Jn 1 (1)	H
SE12-5-24				Jn 1 (4)	P
SW28-5-24				Jn 1 (1)	P
SE29-5-24				May 18 (3)	P
NE29-5-24				Jn 1 (1)	P
SE30-5-24	Jn 1 (1)			Jn 1 (10)	P
NE30-5-24			Jn 1 (1)		P
NW 2-7-24			May 3 (1)		H
SE 8-8-24				May 23 (1)	P
NE14-8-24			May 3 (4)		H
NE15-8-24			May 3 (2)		H
SW14-9-24	Jn 30 (1)				H (N.Short)
NW19-11-24			Jn 25 (1)	Jn 25 (2)	P
SE20-2-25			Jn 16 (1)		P
NE 8-4-25				May 8 (2)	P
SW 9-4-25				May 29 (1)	P
SW10-4-25				May 8 (8)	P
NE10-4-25				May 29 (1)	P
NW12-4-25				May 8 (7)	P
SW13-4-25				May 29 (4)	P
SE14-4-25				May 29 (6)	P
NE16-4-25				May 8 (4)	P
NW17-4-25				May 8 (4)	P
SE30-4-25				May 18 (3)	P
NW34-4-25			May 18 (1)	May 18 (1)	P
SE35-4-25				May 18 (1)	P
SW 3-5-25			May 18 (1)		P
NE 3-5-25			Aug 3 (1)		P
NW 7-5-25	Jy 18 (1)				H
SW 8-5-25	Jy 18 (1)				P
NE13-5-25				May 11 (1)	P
NE19-5-25	Jy 18 (2)				P
NW19-5-25		Jy 18 (1)			P
NE21-5-25		Jn 1 (2)		Jn 1 (3)	P
SW22-5-25			May 11 (2)	May 11 (1)	P
NW22-5-25	Jn 1 (3)	Jn 1 (2)			H
SW27-5-25			May 18 (1)		H
NE27-5-25				Jn 1 (4)	P
NW27-5-25		Jn 1 (1)			HA
SE28-5-25				Jn 1 (2)	P
NE31-5-25	Jy 18 (2)				P
SE34-5-25			Jn 1 (1)		H
SW35-5-25		Jy 19 (1)			C
NE11-6-25			Jy 19 (1)		P
NW 6-7-25	Jn 15 (1)		Jn 15 (3)	Jn 15 (1)	HA
NW 7-7-25			JN 15 (1)		HA
NE 8-7-25	May 3 (1)			May 31 (1)*	HA & P*
NW 8-7-25			Jn 15 (2)		P
SW10-7-25	Jy 9 (2)		May 31 (1)*		P & H*
SW19-7-25				May 17 (2)	P
SE21-7-25				May 31 (1)	H

SW21-7-25			Jn 15 (1)		P
NE21-7-25	Jn 8 (1)		May 31 (3)		H
SW22-7-25	May 31 (1)				P
NW22-7-25			May 31 (1)		H
NW26-7-25	May 31,Jy 27 (1)				P
NE27-7-25			Jy 27 (1)		H
NW28-7-25			Jn 15 (1)		P
NE33-7-25	Jy 27 (1)		Jy 27 (2)		P
NE 3-8-25	Jn 15 (1)				H
NW 3-8-25			Jn 15 (1)	Jn 15 (2)	P
SW 4-8-25	Jy 27 (2)				H
NE 4-8-25	Jy 27 (1)		Jy 27 (2)	May 17 (5)	P
NW 4-8-25	Jn 15 (1)			Jn 15 (3)	H
NE 5-8-25			Jn 15 (1)	Jn 15 (3)	P
NW 7-8-25	May 23 (1)		May 23 (1)	May 23 (1)	HA
SE 8-8-25			Jy 27 (2)	May 17 (12)	P
NE 8-8-25			May 23 (1)		H
SE 9-8-25			Jn 15 (2)	May 17 (5)	P
SW 9-8-25	Jy 27 (2)	Jy 27 (1)	Jy 27 (4)	May 17 (8)	P
NW 9-8-25				May 17 (4)	P
SE10-8-25	Jn 15 (1)			Jn 15 (1)*	H & P*
SW10-8-25			Jn 15 (2)		P
SW16-8-25				May 23 (4)	P
SE17-8-25			May 17 (2)	May 17 (10)	P
NW17-8-25				May 17 (3)	P
SE18-8-25	May 23 (1)		May 17 (1)	May 23 (4)	P
SE18-8-25	May 17 (1)				H
SW18-8-25				May 17 (3)	P
NE18-8-25	May 23 (1)		May 23 (1)	May 23 (2)	P
SW19-8-25			May 23 (1)		P
SE 4-9-25				May 23 (2)	HA
NE 4-9-25				May 23 (4)	P
SE 9-9-25			May 23 (1)		P
NE 8-12-25				May 2 (2)	P
NW10-12-25				Apr 25 (3)	P
SW25-12-25				Apr 25 (1)	P
SE26-12-25				Apr 25 (2)	P
SW20-13-25	Jy 20 (1)				P
NW 7-1-26	May 30 (1)				P
SW30-2-26	Jy 27 (2)	Jy 27 (2)			P
NW30-2-26	Jy 31 (6)	Jy 31 (2)	Jy 31 (1)		P
NE31-2-26				May 29 (2)	P
NW31-2-26	May 29 (1)			May 29 (2)	P
NW32-2-26				May 29 (5)	P
SW 4-3-26				May 29 (3)	P
SE 5-3-26				May 29 (5)	P
SW 5-3-26				May 29 (6)	P
SE16-3-26		Jy 10 (1)			C
NW16-3-26				May 29 (4)	P
SW17-3-26	Jy 10 (1)				HA
SW21-3-26				May 29 (2)	P
NW32-3-26				May 10 (10)	P
NW 2-4-26				May 10 (3)	P
NE13-4-26				May 10 (1)	P

NW13-4-26			May 10 (1)	May 10 (1)	P
SE24-4-26				May 3 (1)	P
NW30-4-26	May 25 (2)		May 25 (1)		P
NW34-4-26				May 29 (1)	P
SW 3-5-26				May 29 (1)	P
NE 3-5-26			May 8 (2)	May 29 (4)	P
NW 3-5-26			May 8 (2)	May 29 (6)	P
NW 5-5-26	My25,Jy18 (4)	Jy 18 (1)	May 8 (3)	May 8 (4)	P
SE 6-5-26				May 25 (1)	P
SW 6-5-26	Jy 26 (1)			Jn 7 (6)	P
NE 6-5-26				May 25 (1)	P
NW 7-5-26	Jy 18 (1)		May 25 (2)	May 25 (3)	P
NE 9-5-26	Jy 17 (1)		May 3 (3)		H
NW10-5-26	Jy 17 (2)		May 3 (2)		P
SE13-5-26			May 9 (1)	May 29 (8)	P
SE14-5-26			May 3 (1)		P
SE16-5-26			May 3 (1)		H
NW16-5-26	Jy 26 (1)		Jy 26 (1)	Jy 26 (1)	P
SW18-5-26	May 29 (1)		May 29 (2)	May 29 (3)	P
NW19-5-26	Jy 18 (2)	Jy 18 (2)		May 9 (3)	P
NE20-5-26			My11,Jn15 (1)		P
NW21-5-26	Jn 6 & 15 (2)		Jn 6 (2)		P
NE22-5-26			May 11 (1)		HA
NW22-5-26	May 11 (1)			May 11 (2)	I
SW27-5-26			Jy 26 (1)	My11,Jn15 (4)	P
SE28-5-26	Jy 26 (4)		Jn 6 (2)	My11,Jn15 (5)	P
SW28-5-26				Jn 15 (1)	P
NW28-5-26			Jn 6 (1)		P
NE31-5-26				May 9 (4)	H
NE31-5-26	Jn 18 (1)		Jn 27 (1)	May 9 (6)	P
SW32-5-26				May 22 (2)	P
NE32-5-26	Jn6,My22 (2)		Jn 6 (1)	Jn 6 (1)	P
SW33-5-26	May 22 (1)				HA
SE34-5-26	Jn 6&15 (1)			May 4 (6)	P
SW34-5-26				May 22 (3)	P
NE34-5-26	Jn 15 (1)			Jn 15 (1)	P
SW35-5-26	May 22 (1)				I
SW 1-6-26			Jn 15 (1)		P
SE 5-6-26	Jn6,My22 (2)	May 22 (1)	Jn 6 (1)	Jn 6 (5)	P
NW 5-6-26				May 9 (2)	P
NE14-6-26				Jn 15 (2)	P
NW20-6-26				Jn 6 (4)	P
SE23-6-26		Jn 15 (1)			I
NE23-6-26				Jn 15 (1)	P
NW24-6-26	Jn 15 (1)		Jn 15 (2)		H
SW25-6-26	Jn 15 (1)		Jn 15 (1)		H
NW25-6-26			Jn 15 (2)		H
NW27-6-26	My31,Jy26 (3)			May 17 (4)	P
SE29-6-26	Jn 8 (12)	Jn 8 (4)	Jn 8 (8)	Jn 8 (10)	P
SW29-6-26			Jy 19 (1)		P
NE29-6-26	Jn 8 (2)				H
SW30-6-26				May 17 (1)	P
SE31-6-26	Jy 19 (3)		Jy 19 (2)	Jy 19 (2)	P
SW31-6-26			Jy 27 (2)		P

SE32-6-26			Jn 6 (2)		P
SW34-6-26			May 31 (1)		H
SE35-6-26	Jy 12 (1)	Jy 12 (1)		Jn 15 (4)	P
NE35-6-26			Jn 15 (3)		P
NW 2-7-26				May 17 (4)	P
SE 3-7-26			May 17 (2)	May 17 (2)	P
NE 3-7-26				May 17 (2)	P
SW 7-7-26	Jn 6 (1)		Jn 6 (1)	Jn 6 (1)	P
SW10-7-26				Apr 18 (4)	I
NW11-7-26				May 17 (4)	P
SE14-7-26				May 17 (5)	P
SW14-7-26				May 17 (4)	P
SE24-7-26				May 17 (7)	P
SE13-8-26	May 23 (1)				HA
SE24-8-26			May 23 (1)	May 23 (1)	P
SE16-10-26			May 2 (1)		H
NE26-1-27	May 30 (1)		May 30 (1)	May 30 (2)	P
NW14-2-27		May 30 (2)		May 30 (3)	I
SE24-2-27	May 29 (1)				P
SW 3-4-27				May 9 (2)	P
NW 5-4-27				May 9 (2)	P
NW25-4-27				May 25 (4)	P
NE31-4-27	Jn 13 (1)				HA
NW31-4-27	My30,Jn15(2)				HA
NW35-4-27		Jn 7 (2)			P
SE 1-5-27				May 9 (1)	P
NW 5-5-27	May 25 (1)			May 25 (6)	P
SW 6-5-27				May 10 (5)	P
NW 6-5-27			May 30 (2)	My10,Jn15(10)	P
NE 9-5-27				May 17 (2)	P
NW 9-5-27	Jn 27 (2)			May 17 (2)	P
NE10-5-27	Jn 7 (1)			Jn 7 (8)	P
NW10-5-27				May 17 (3)	P
SE11-5-27				May 25 (4)	P
NW11-5-27				Jn 7 (6)	P
SW12-5-27	May 25 (1)				HA
NE12-5-27	Jy 18 (1)				H
NW14-5-27				Jn 7 (8)	P
SE16-5-27				May 17 (10)	P
SW16-5-27	Jy 27 (2)			May 17 (6)	P
NE16-5-27	Aug 2 (1)				P
NW17-5-27			May 10 (1)		H
SE19-5-27				Jn 6 (3)	P
SE20-5-27	Jn 13 (1)			May 22 (4)	P
SW20-5-27			Jn 15 (1)	Jn 6 (6)	P
NE20-5-27	Jn 15 (1)	Jn 15 (2)		May 22 (2)	HA
NW20-5-27	Jn 15 (1)			Jn 6 (4)*	HA & P*
NE21-5-27			Jn 15 (1)	May 22 (6)	P
NW21-5-27			Jn 15 (1)	May 22 (4)	P
SE22-5-27				May 17 (4)	P
SW22-5-27				May 9 (5)	P
NE22-5-27	Jn 8 (18)	Jn 8(27)	Jn 8 (5)		I
NW22-5-27				Jn 15 (1)	P
NE27-5-27		Jn 15 (2)			HA

					H
		Jn 20 (1)			HA
SE 7-6-27			May 17 (2)		P
SW25-6-27			May 17 (1)		I
SE26-6-27					P (Bradell)
NE 1-7-27	Jn 6 (1)				P
SE12-7-27	Jy 18 (1)		Jn 6 (1)		P
NE12-7-27			Jn 20 (1)	Jn 6 (1)	P
NW12-7-27				Apr 25 (6)	P
NW18-8-27				Jn 7 (1)	HA
SE26-15-27			Jn 7 (1)		P
NW11-1-28			Jn 5 (1)		C
NW29-1-28		Jn 20 (1)		May 9 (3)	P
SE17-2-28					H
NW34-2-28				May 9 (10)	P
SE 6-3-28	Jn 15 (2)		Jn 15 (1)	May 9 (8)	P
NE 6-3-28					H
NW 6-3-28			Jn 15 (1)	May 9 (1)	P
NE 8-3-28	Jn 15 (1)				HA
NW 8-3-28		Jn 15 (2)		May 9 (3)*	HA & P*
SW 9-3-28					H
NW 9-3-28	Jn 15 (1)			May 24 (2)	P
SE15-3-28	May 24 (1)		May 24 (1)	Jn 15 (3)	P
SW15-3-28				May 30 (2)	P
NW15-3-28				Jn 15 (2)	P
NE16-3-28			Jn 15 (1)	May 30 (1)	P
NW16-3-28					H
SE18-3-28	May 30 (1)				P
NE21-3-28	Jn 15 (1)		Jn 15 (1)		P
SW22-3-28	Jn 15 (1)		Jn 15 (1)		H
NW22-3-28	May 30 (2)		Jn 15 (2)		H
SE28-3-28					P
NW30-3-28	Jn 5 (1)			Jn 5 (2)	P & HA*
SW31-3-28	Jn 5 (1)		May 30 (1)*		P
SE33-3-28	Jn 21 (1)	May 30 (1)*	Jn 15 (1)	May 31 (1)	P
NE33-3-28				May 9 (1)	P
NW 1-4-28				May 9 (8)	H
SW 2-4-28					P
NE 3-4-28	Aug 7 (2)			May 30 (2)	H
SE 4-4-28					P
NW 5-4-28	May 24 (1)				P
NE 6-4-28	May 24 (1)				P
NW 6-4-28	Jn 28 (1)			May 9 (4)	HA
SW 8-4-28			May 24 (2)		H
NE 9-4-28	May 30 (1)	Jn 14 (2)	Jn 15 (1)		H
NE 9-4-28			Aug 16 (2)		P
SE10-4-28	Aug 7+16 (2)		Jn 15 (1)		P
NW10-4-28			Aug 7+16 (2)	May 9 (5)	C
SW11-4-28	Aug 7+16 (2)				P
NW14-4-28	Jn 28 (1)		Jn 15 (1)		I
NW15-4-28			Jn 15 (2)		HA
SE16-4-28	Jn 15 (1)	Jn 15 (1)			P & I*
SE20-4-28		Jn 21 (1)			P
NE20-4-28	Jn 21 (1)	Jn 21 (2)*	Jn 15 (1)		HA
SE21-4-28					
SW21-4-28		May 31 (1)			

					P
NE21-4-28	Jn 12+21 (2)		Jn 21 (2)		HA
SE22-4-28	May 30 (1)		May 30 (2)		P
NE22-4-28		Jn 12 (1)		Jn 15 (2)	P
NW22-4-28		Jn 15 (1)			HA
SE23-4-28	Jn 28 (3)	Jn 28 (2)			HA
SW23-4-28	Jn 28 (1)	Jn 28 (1)	May 30 (1)	May 30 (7)	P
NE23-4-28				May 30 (4)	P
NE26-4-28				Jn 15 (2)	P
NW26-4-28				Jn 15 (3)	P
SW27-4-28		Jn 15 (2)	Jn 15 (3)		P
NE27-4-28	Jn 15 (1)		Jn 15 (5)	Jn 15 (1)	P
NW27-4-28	Jn 15 (1)	Jy 10 (1)	Jn 21 (3)		P
SE28-4-28		Jn 15 (1)	Jn 12 (1)		P
SW28-4-28			Jn 15 (2)		P
NE28-4-28			May 24 (1)		P
SE33-4-28			May 24 (1)		P
NE33-4-28					P
NW33-4-28	Jn 13 (1)			May 30 (4)	P
SE35-4-28				Jn 15 (3)	P
SW35-4-28	May 31 (1)			May 31 (3)	P
NW35-4-28			Jn 28 (2)		C
SW36-4-28	Jn 28 (1)			My10,Jn15(6)	P
SE 1-5-28				May 30 (6)	P
NE 1-5-28		Jy 10 (1)	May 24 (2)	Jn 5 (5)	P
SE 3-5-28					C
SW 3-5-28					P
NE 3-5-28	Jn 12+26(4)	Jn 12+26 (2)	May 24 (1)		P
SW 4-5-28			Jn 7 (2)		P
NE 4-5-28	Jn 7 (1)	Jn 7 (1)			I
NW 4-5-28	Jn 7 (1)				P
NW 4-5-28	Jn 7 (1)	Jn 7 (1)		Jn 6 (5)	P
SW 5-5-28				Jn 6 (1)	P
SE 6-5-28			Jn26,Aug1(3)		P
SE10-5-28			May 2 (2)		P
SW10-5-28					HA
SE23-5-28	Jn 26 (1)				HA
NW23-5-28	May 24 (3)		May 31 (1)	May 31 (5)	P
NE23-5-28	May 24+31 (2)			May 31 (1)	P
NE24-5-28				May 24 (4)	P
NW24-5-28	Jy 25 (1)	Jy 25 (1)			HA
SE25-5-28			Jn 6 (1)		P
SW25-5-28			May 24 (1)	May 24 (6)	P
SE26-5-28				May 24 (11)	P
SW26-5-28				May 31 (2)	P
SE27-5-28				May 31 (3)	P
NW27-5-28	May 31 (1)			May 31 (2)	P
SW34-5-28				May 31 (1)	P
NW 4-7-28			Jn 6 (1)		P
NE 5-7-28			Jn 6 (1)		P
NE 9-7-28	Jn 6 (1)		Jn 6 (1)		P
NW 6-1-29				Jy 24 (10)	P
SE 8-1-29		Jn 15 (1)			P
NE 8-1-29		Jn 15 (1)			H
NE 9-1-29		Jn 7 (1)			C

NW11-1-29			Jn 7 (1)	Jn 7(1)	H
NW13-1-29	Jy 17 (1)			May 17 (8)	P
NW15-1-29	Jn 28 (1)				HA
SW16-1-29	Jn 15 (1)			Jn 7 (2)	P
NW16-1-29		Jn 15 (1)			C
SE21-1-29		Jn 15 (1)	Jy 24 (1)	Jn 7 (6)	P
SE22-1-29	Jn 7 (1)				P
SW22-1-29	Jy 24 (1)				P
SE23-1-29	Jn21,Jy10(2)	Jy 10 (1)			P
SW23-1-29	Jn 28 (1)				P
NW23-1-29			Jn 12 (1)		P
SE24-1-29				May 17 (10)	P
NE25-1-29	Aug 8-14 (1)	Aug 8-14 (2)	Aug 8-14 (3)		P
NW25-1-29	Aug 8-14 (6)	Aug 8-14 (2)	Aug 8-14 (1)		H
SW26-1-29	May 30 (1)				HA
NW26-1-29	Aug 1-8 (3)				P
SE27-1-29		Aug 1 (2)			P
NE27-1-29	Aug 7-14 (7)	Aug 7-14 (4)	Aug 7-14 (3)		H
NW27-1-29	Aug 7-14 (4)		Aug 7-14 (3)		H
SE28-1-29	Jn 15 (1)		Jn 15 (1)		P
SE33-1-29			Aug 1 (3)		P
NE 3-2-29	Jn 15 (1)	Jn 15 (1)		Jn 15 (2)	P
NW 3-2-29	Jn 15 (1)	Jn 15 (1)			HA
SE10-2-29			Jn 15 (1)		H
SE11-2-29	Jn15,Aug1(8)	Jn 15 (2)	Jn 15 (2)	Jn 15 (2)	P
SW11-2-29	Aug 1 (1)				HA
NE11-2-29			.	May 30 (1)	P
SW13-2-29	Jn 20 (1)	Jn 15 (2)		Jn 15 (1)	P
NW22-2-29				May 9 (2)	P
NE26-2-29				My9,Jn15 (3)	P
NE30-2-29		Jn 7 (1)			C
SE 1-4-29		Jn 13 (1)			I
SW 1-4-29		Jn 7 (1)			P
NW28-4-29		Jn 7 (1)			HA
NW28-4-29				Jn 7 (2)	P
SE33-4-29			Jn 7 (1)	Jn 7 (4)	P
SW 1-5-29				May 31 (2)	P
NW21-5-29				May 31 (2)	P
SW28-5-29				May 31 (2)	P
NW28-5-29				May 31 (3)	P
SE22-17-29			Apr 26 (1)		P
NW28-17-29			Apr 26 (1)		P
NE29-17-29			Apr 26 (2)		P
SE 8-18-29			Apr 26 (2)		P
SW15-18-29			Apr 26 (1)		P
SE16-18-29			Apr 26 (2)		P
SW17-18-29			Apr 26 (1)		P
NW18-19-29				Apr 26 (1)	P
NW16-22-29			Apr 26 (1)		P